THE PRACTICAL GUIDE TO HEALTH





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The Practical Guide to Health

The Practical Guide to Health

A Popular Treatise on ANATOMY, PHYSIOLOGY, and HYGIENE, with a Scientific Description of Diseases, Their Causes and Treatment ∴ ∴ ∴ ∴

Designed for Nurses and for Home Use

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PREFACE.

THE proverb, "A sound mind in a sound body," represents to some degree the regard the ancient Greeks had for health, and also their conception of the relation that physical well-being sustains to mental vigor.

To-day life has become so changed that the great tendency is to make the physical, mental, and moral health subordinate to the acquisition of wealth, and social and political position. As a consequence, the preservation of health has become a secondary consideration.

The writer is of the opinion that the study of physiology should be made a basic principle in all educational effort, and that each individual should regard his health as sacredly as his character. Every man is not only the architect of his own character, but also the custodian of his own health and physical well-being.

Health is the most valuable temporal blessing that any human being can possess, and a knowledge sufficient to understand the organism that is so "wonderfully and fearfully made," and to maintain it in health, is far more important than a knowledge of all the arts.

When the health comes to be regarded in this light, the study of physiology is more fascinating than a story. It is a study of vital interest, and ceases to be a matter of dead bones and dissected organs, repulsive to the esthetic sense. With this in mind, the subjects of anatomy, physiology, and hygiene have been presented in simple language, and in the most practical manner, with the effort to avoid all theories and unimportant details. No essential fact of physiology has been omitted, and no effort has been spared to present each fact in harmony with the latest scientific investigations.

This is a progressive age, and the time has passed when the knowledge of how to care for the body can be retained

by the few, to be given out as they see fit. There is a growing demand for popular literature on the subject of health.

The writer believes thoroughly that every father and mother should be sufficiently informed in reference to the normal body and its functions, and should possess sufficient knowledge of the common diseases and their treatments, to be able to care for members of the family under ordinary conditions. It is far more important that a mother know how to care for the health of her children than that she be able to teach them music or painting.

The author does not entertain the least idea that this book should take the place of the family physician when the services of a physician are needed. But there are many conditions and circumstances in every home under which a reliable book on health and disease is indispensable, and greatly supplements the services of the physician.

Very little is said in this treatise about the use of drugs in the treatment of diseases; for self-drugging and the use of patent medicines can not be too severely condemned. The promiscuous swallowing of medicines for every slight ailment, and in order to save a doctor's bill, has caused untold misery in the world. If medicines are necessary, they should be dispensed by a reliable physician.

In the preparation of this volume the author has consulted all the leading standard medical writers, among which mention is made of Gray's Anatomy, Gerrish's Anatomy; Anatomy of the Nervous System, by Baker, Gardinier, Edinger; Physiology, by Landois and Sterling, Hall, Kirk, Thornton; Diseases, by Osler, Pepper, Anders, Strümpell, Brunton, Hyde, Holt, Babcock, Bruce, Tirard; Obstetrics, by Hirst, Davis, American Text-Books; Hydrotherapy, by Kellogg; Dietetics, by Thompson, Yeo, Knight. The writer wishes especially to thank Lea Brothers & Company for the kind permission to use a number of illustrations by Testut from Gerrish's Anatomy.

F. M. R.

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Anatomy, Physiology, and Hygiene

PART ONE



Lovers of art travel thousands of miles to visit the ancient ruins of a long-buried city

CHAPTER I

The Masterpiece of Creation

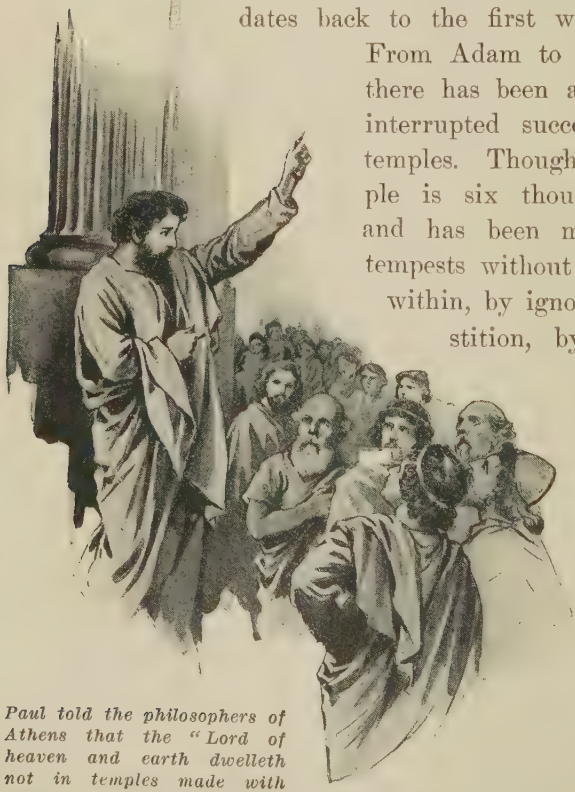
Lovers of art travel thousands of miles to visit the ancient ruins of a long-buried city, or to see a pillar, a column, all that now remains of a once famous temple erected three or four thousand years ago. Scores of volumes, representing years of toil, are devoted to descriptions of the beauties and wonders of Egyptian, Etruscan, Venetian, Grecian, Byzantine, and Roman structures of rare and marvelous architectural design. The mystery of antiquity, which is associated with these ancient ruins, has always exercised a powerful influence over the mind of man.

The most famous temple of olden times was Solomon's temple. It was the marvel of its age for design and splendor, and was known far and wide. This temple was built of stone and costly wood, and adorned with gold and silver and precious stones. A vast army of men spent seven years

in building it, and, what was considered more remarkable, "there was neither hammer nor ax nor any tool of iron heard in the house, while it was in building."

But more wonderful in design and more beautiful in architectural structure than any column, arch, pillar, ancient ruin, or even than Solomon's temple, is the human body. Paul told the philosophers of Athens that the "Lord of heaven and earth dwelleth not in temples made with hands;" but he does dwell in temples of his own building.

Famous ruins of ancient Egypt and Babylon date back three and four thousand years; many cities have long been buried and their places forgotten, but this rare and beautiful temple, the human body, dates back to the first week of creation. From Adam to the present day there has been a continuous uninterrupted succession of living temples. Though the human temple is six thousand years old, and has been marred by fierce tempests without and sullen fires within, by ignorance and superstition, by sin and sickness, and though it has passed through raging storms of passion and disease, yet it has weathered these elements of disintegration. Marred and defaced as it is, it



Paul told the philosophers of Athens that the "Lord of heaven and earth dwelleth not in temples made with hands"

still stands, a monument of beauty to the Master Architect, who, in the beginning, fashioned it after the divine similitude.

Carbon is an element necessary to all organic life. It is found in all animals and plants; it is the part that turns black when these are burned. Carbon occurs in nature in many combinations, but is found pure in only two forms, the diamond and the graphite. The diamond is pure carbon crystallized. It is perfectly transparent, emits light, and is a precious "living" stone. Graphite is pure carbon, yet it is as black as coal, and soft. The diamond and the graphite, both pure carbon, serve two entirely different purposes in the world.

These two forms of carbon represent in a way the difference between men and the lower animals. They are made from the same material, and there is very little actual difference in the structure and function of their organs. In fact, it is impossible to tell the difference between the structure of the various corresponding organs when placed under the microscope. Why, then, may the human body be regarded as a temple, any more than the body of any animal, inasmuch as God gives life and breath to both?

Solomon's house was made from the same kind of material as that which entered into the making of the temple. It took even more time to build Solomon's house than it did to build the temple. What was the difference? — The temple was consecrated and set apart for a sacred and holy purpose, while Solomon's house was not. This body, though made from materials common to all animals, is more than an organism; it was designed to be the temple of the living God.

While the body is not to be worshiped, it is to be held as a sacred trust. The proper care of it is just as much a part of the service due to God as is prayer or the giving of alms. A dead body is held in reverence and awe, even by uncivilized tribes, and it is against the law of nations to mutilate a body

slain in battle. How much greater respect should be paid to a body which throbs with life and intelligence, and in which we have unmistakable evidence that a divine power is at work!

The diamond is carbon crystallized, hence, absolutely pure and exceedingly beautiful. The body is composed of the dust of the ground, organized by creative power, and endowed with life from God. It is composed of elements that at some past time served other forms of life, but now tarry with us for a while. Dust, sunlight, and air are converted into brain, bone, blood, and muscle. God, who takes common carbon and makes a beautiful diamond, takes common dust, molds and fashions it, breathes into it, and of it produces a being who is a candidate for immortality. Marvelous are the works of the Lord!



FIG. 1
Muscular fiber-cells from human arteries, magnified 350 times

The body is not only wonderful for what it is, its structure, but it is more wonderful and full of mystery because of what it does, its functions. For a time a dead body is as marvelous in structure as a living one; but the life has gone out of it. It has lost its personality and individuality, hence, its charm. Where function is there is life, and to us function is more important than structure. The mystery of life is the mystery of God, hence to study functions is to know more of God's way of working.

It sounds strange and very much like a fairy tale to say that a large man, six feet tall, and weighing two hundred pounds, came from one single little body called a cell. Yet it is true. It is more fascinating than to read a story to

follow that little cell, as it multiplies into other little cells, forming heart, lungs, brain, liver, muscles, blood, bones, until finally it has developed into a beautiful, symmetrical body.

The growth of the body is all from within. Not only is the entire body made up of little cells, but all the complex functions of the body are performed by these tiny individual bits of life.

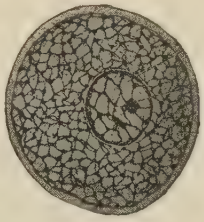


FIG. 2
Diagram of a cell, highly magnified

At one time these little bodies were thought to be sacs, and so they were called cells, which means sacs. Now we know that a cell is a great deal more than a sac. It is a living bit of something called protoplasm, a living body that breathes, and eats, and moves, and grows, and gives off other cells, and dies. Its life is just as real as a human life, and each individual human life in health depends upon the happy working together of the millions and myriads of microscopic bits of life that enter into the composition of its own body.

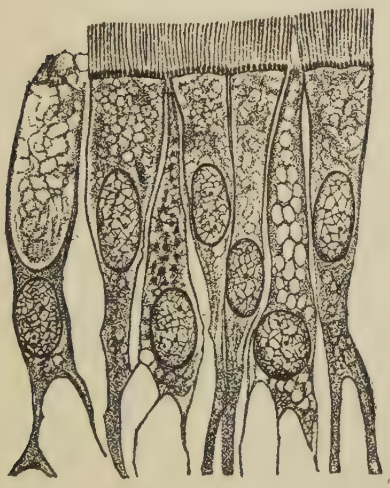


FIG. 3
Ciliated epithelium cells from the trachea (windpipe)

These little microscopic cells form every structure of the body, even to the hairs. They are sympathetic and neighborly, working together in groups and colonies, thus forming organs and glands. All the cells in any one organ are similar, but the cells of different organs and tissues possess a distinct individuality. Thus nine billion cells are grouped together to form

the brain and spinal cord, and we call them nerve-cells. These are the most highly organized workers in the body, for through them instructions are conveyed to all the other cells. With them we think, reason, remember, act, and are conscious of being. Another colony of cells forms gastric juice, and assists in digesting food. A very large band of busy cells, called hepatic cells, constitute the liver, which works night and day.



FIG. 4
Simple epithelial cells

So, up and down the corridors of the human temple and in all the various apartments, everywhere are groups of cells, all exceedingly busy, and working with an intelligence that impresses one deeply that they are under the guidance of the Master Architect.

These cell workers are the builders of the body. They work with the most mathematical precision, and with infinite skill. When these cell workers are not interfered with, there is no noise or commotion or friction in the body. Altogether they make a beautiful, harmonious whole, each part co-operating with every other part. Each organ is unique in its work, striving as much for the whole as for itself.



FIG. 5
Simple columnar epithelium from mucous membrane of the intestine, with cells pouring out their contents

There is nothing more beautiful in all the creation than a healthy and symmetrically developed human body, with a well-balanced intellect expressing itself through every feature. In the beginning, man, crowned with glory and honor, was made upright, able to talk face to face with his Maker. Possessing a conscience and high

moral and reasoning powers, and having a countenance into which flash mastering mental impressions, man towers above all other creatures. The human smile can not be imitated or duplicated. The human hand, with its flexibility, adaptability, gracefulness, compactness, strength, and dexterity, is marvelous beyond compare. The human foot in itself is a masterpiece of creation. That a body possessed of such rare beauty and power and design should have evolved to its present state through an infinite period of time from lower organisms, is not only a colossal deception, but an idea belittling to the Creator.

CHAPTER II

The Framework of the Body

1. When you see the frame of a house going up, you can tell by its size just how large the building is to be. But the size of a baby is no sort of criterion from which to estimate the dimensions of the future man. This is because the baby's framework grows, while that of the house does not. A frame of timber can not grow, but a frame of bones is a living frame, and grows in size and strength, like all other parts of the body. It takes twenty-five years for the living framework to reach its full size.

2. The framework of the body is called the skeleton. It is made of two hundred eight distinct bones. These bones are alive. They are filled with little living cells that keep building and renewing them from inside.

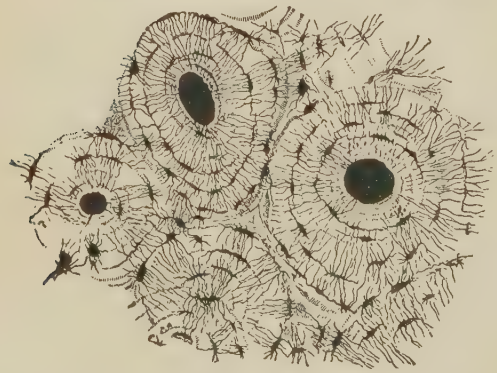


FIG. 6

Transverse section of compact tissue (of humerus), magnified about 150 times

The bones not only support the body and give it strength, but they help also to divide it into its various parts.

The bare skeleton of the body is not a pleasing sight. It was not

intended to be seen, but to be covered with muscle, flesh, and skin, as the frame of a house is covered with brick, plaster, boards, and paint.

Dead bones soon become dry and brittle, but there is not one dry bone in a living body.

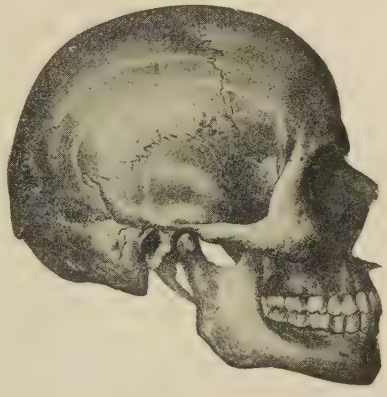


FIG. 7
Side view of the skull

The timbers and joints of a house are fastened together with nails and braces. The house is built to stay just so. Here is another of the marvelous contrasts between divine and human building. In the body only a few of the bones are fastened together. Most of them are so arranged as to give freedom and grace of motion that would be the wonder of architecture were it not so common that we seldom think about it.

Who, seeing a child running and tumbling, or an acrobat rolling himself into a ball, would imagine that this limber and lively person has two hundred eight separate bones inside his body! It is because the Master Builder himself planned the bones, and so arranged and placed them that all move in harmony, without friction, that this wonderful framework adapts itself to every need of the body.

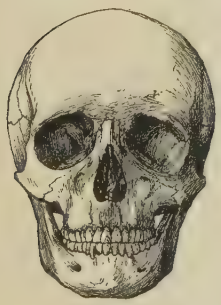


FIG. 8
Front view of the skull

3. *Classification of Bones.*— The part of the skeleton that forms the framework of the head is called the skull, or cranium. There are eight flat bones in the skull. They are so united that they make a large room, or cavity. This is the room occupied by the brain. All the delicate

centers where the sensitive little brain-cells work, are protected and surrounded by the strong, firm walls made by these flat bones.

In the baby these bones are not yet perfectly formed and united. They could be moved by the fingers, but this would not be safe for the baby. The soft spot on top of a baby's head is part of the space left for these bones to fill. It is called the fontanelle, or little fountain. After a few months the bone has grown in and filled this space, and the soft spot has disappeared. By the time a child is seven or eight years old, the bones of the skull are firmly united.



FIG. 9
Bones of the ear: (1) hammer, (2) anvil, (3) stirrup

In the bottom of the skull are many openings for the passage of blood-vessels and the many pairs of brain nerves.

In the face and the nose there are fourteen odd-shaped or irregular bones. They help to give shape to the face. The muscles that move the face and the lower jaw are attached to them.

There are three small bones in the ear,— the hammer, the anvil, and the stirrup. These make six more bones in the head.

Your teeth are bones. They are the hardest bones in the body. So you have thirty-two bones in your mouth.

One of the most interesting bones in the body is the backbone, or spine, which is not, as its name might indicate, simply one bone, but is made up of twenty-four peculiarly shaped little bones, called vertebræ. This word comes from a Latin word meaning "to turn."

Each little vertebra has a large round hole in the middle. The vertebræ, close together but with little cushion rings of cartilage or gristle between each two, are all strung, like large beads, on the great trunk line of the nervous system, the spinal cord. They make a strong, perfect closed canal for the spinal cord, that protects it completely, and yet that can bend in any direction. The vertebræ and the spinal cord form the spinal column.

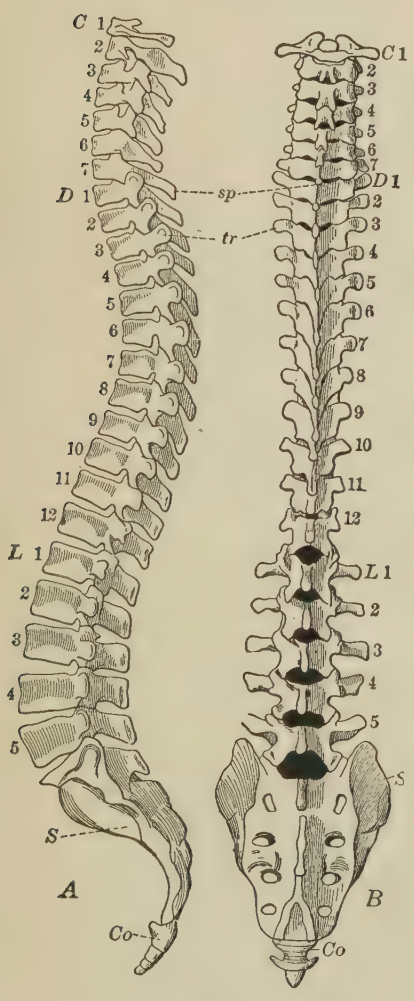


FIG. 10

The spinal column as seen from left side (A), and from behind (B), (C) cervical vertebra, (D) dorsal vertebra, (L) lumbar vertebra, (S) sacrum, (Co) coccyx

The spinal column rests upon the sacrum, or sacred bone, a wedge-shaped bone between the hip-bones. Below the sacrum is a little chain of bones, called the coccyx or cuckoo bone.

The skull rests upon the first vertebra, which is called the atlas. The atlas rests upon the second vertebra, or the axis, in such a way that it rotates freely in all directions.

The spinal column is curved. The curve adds much to the beauty and grace of the body. It also helps to prevent the brain from being jarred by walking and jumping. Jarring is further prevented by cushions of cartilage between the vertebræ, and between all the bones from head to foot.

When you bend back and

forth, up and down, or sidewise, you never feel even the presence of those twenty-four vertebræ in your spine. They do not grate on one another in turning. No matter how sharp an angle you make, the little cushions protect the edges of the bones.



FIG. 11
The bones of the right forearm

The framework of the upper trunk, the chest, is formed chiefly by twelve pairs of flat, curved bones, called the ribs. The ribs start from the back-bone, being attached to the vertebræ, and pass around the body after the manner of hoops around a barrel. In front of the chest ten pairs of the ribs are united to a bone called the sternum, or breast-bone. The two lower pairs of ribs are short, and are loose at the front end. They are called floating ribs. The framework of the shoulder is formed by the union of two bones, the collar-bone, or clavicle, and the shoulder-blade, or scapula. The clavicle and the scapula hold the arm in place, and unite it with the trunk.

The bone in the arm above the elbow, is the humerus. There are two bones in the forearm, or the part of the arm below the elbow, the radius and the ulna; eight bones in the wrist, called carpal bones; five in the palm of the hand, called metacarpal bones; and fourteen in the thumb and fingers, called phalanges, which finish this part of the framework.

Two very large, irregular bones, called the hip-bones, or innominate bones, form the body basin, or pelvis. The hip-bones are broad, and protect delicate organs, just as do the skull and the ribs. They also help to support the weight of the entire trunk.

On the outer side of the hip-bone is a round, cup-like hollow, called the acetabulum, in which rotates the round head of the thigh-bone, or femur.

The longest bone in the body is the large bone in the leg above the knee, the femur. Below the knee there are two leg bones, the tibia and the fibula. At the knee in front is the knee-cap, or patella. In the foot are seven ankle or tarsal bones, five longer bones, one for each toe, the metatarsal bones, and fourteen bones in the five toes, the phalanges.

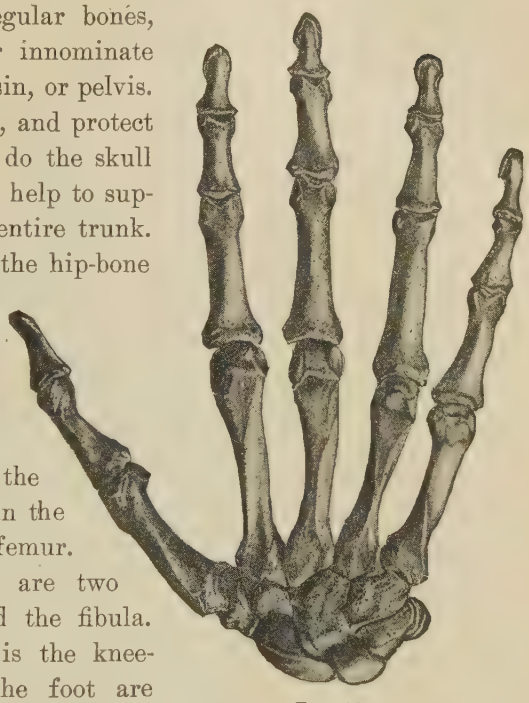


FIG. 12
Bones of the hand

4. *Structure.*— The bones are the hardest parts of the body. The outer surface of the bone is much harder and more solid than the inner portions and ends. In the shaft or long part of the long bones is a canal filled with a soft substance called marrow. The marrow is made up of fat and blood-vessels, and is filled with very important and busy little workers. The ends



FIG. 13
Bones of the foot

of the long bones, where they join with other bones, are large and smooth and porous. If they were as solid as the shaft, they would be very heavy. (See Fig. 14.)

In the bones of the face are many hollow places, or cavities, filled with air. One of these in the frontal, or forehead, bone communicates with the nasal chambers. Another, under the eye, called the antrum of Highmore, and about the size of a hickory-nut, also communicates with the nasal chambers. Back of the throat is one large air cavity and many smaller ones that act as a sounding-board to the voice. If these bones were all solid, the head would be heavily weighted.

When you have a cold in the head or an attack of catarrh, all these air cavities are likely to become affected. If the inflammation extends into them, it is no wonder your head feels big and "all stopped up."

The places where the bones are fastened together are called joints. Some joints are very firm, as the joints in the head bones. The joints of the elbow and the knee are called hinge-joints, because they act like hinges. The arm and the leg swing on them as a door upon its hinges. The shoulder-joint and the hip-joint are called ball-joints, because almost a com-

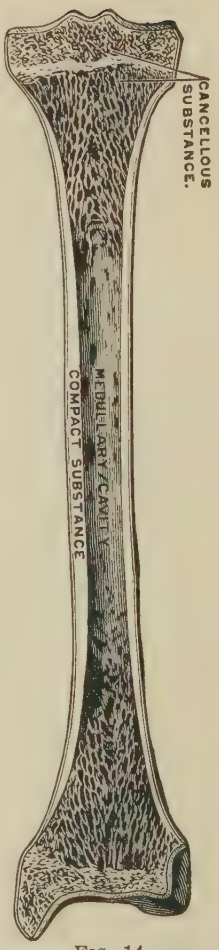


FIG. 14
Section of a long bone (the shin-bone)

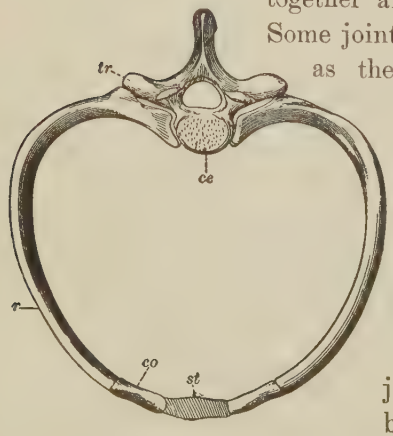


FIG. 15
Articulation of a pair of ribs to a vertebra

plete circle can be made in them by the humerus or the femur.

The ends of the bones are protected by a thick, smooth substance, called cartilage, or gristle. The cartilage also serves as a cushion for the joint, protecting it from injury.

The joints are held together by bands, called ligaments. These ligaments completely surround the larger joints, so that nothing can enter. Inside the ligaments there is a joint water or fluid that oils the joint and keeps it smooth.

If you wrench your foot and tear the ligaments loose, the injury is called a sprain.

5. *Physiology of Bones.*— It is hard to imagine living cell workers in the bones. But they are there, many millions of them, the same active, tireless, busy little bodies that fill every part of the human organism.

They have many things to do, these little bone workers. Not only do they build the framework of the structure, but they are also the most important blood workers in the body. Yes, in the marrow of every bone are countless living cells at work, turning food and drink into blood for the stream of life.

So the bones not only form the framework of the building; not only give shape to the body, and protect all its delicate parts; not only join each other in making movable joints, and unite with the muscles in moving the body where you will; not only serve with the muscles in acting as levers to lift the body, and to help you in all your physical work, but they also shelter innumerable companies of little blood makers that are hidden away in their safe hollows, unseen by any save the Master Builder, serving their purpose in keeping the stream of life steadily flowing into every part of the living structure.

There are two kinds of material in the bones, organic matter and mineral matter. How the little cell workers turn food and drink into these hard substances, how they send a grain of salt here and a bit of wheat there, and change them

both into bone and blood, is one of the secrets that make every part of the building process an infinite mystery.

The bones of a young child have more organic than mineral matter. For this reason young bones are flexible, and do not easily break. It is seldom that a baby's bones are broken by falling. There is so much cartilage in the baby's bones that they rebound almost like a rubber ball.

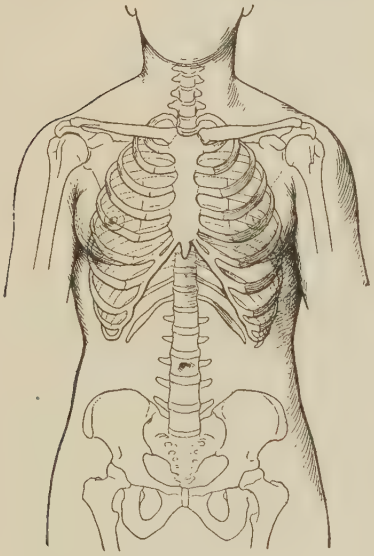


FIG. 16
Skeleton of well-formed female chest

The bones of the aged are very brittle and easily broken, because the organic matter has been carried away by the blood, leaving the mineral matter alone, which does not give the bones much strength. If an aged person's bones are broken, they heal very slowly. The stream of life flows sluggishly, and the little workers, too, are growing feeble. But in a child's body, bones that are broken knit together in a very short time, and presently are as good as new.

6. *Hygiene of Bones.*—Because the bones of children are so soft and yielding, it is of the utmost importance to keep them from being bent and deformed by bad positions or improper clothing. If a baby is urged to walk too early, its legs, not being strong enough to support its body, may become bent, causing the child to grow bow-legged.

If you sit on a seat so high that your feet do not rest on the floor, your thigh-bones may become crooked, or your backbone may be bent to one side or the other.

Sitting at a desk that is too high, so that the elbows must rest upon it, will make the spine crooked.

The habit of standing on one foot will curve the spine. So will resting the weight on one leg while playing the violin.

Sitting much in a rocking-chair, or reading with the head bent over, will cause round shoulders. All these deformities are hard to correct.

If you wish the framework of your body strong and shapely, sit straight, stand with the weight of the body resting on the front of the foot, hips back, chest lifted, head erect.

Be sure that your clothes do not press any bones out of place. The bones may be deformed by tight clothing. Garments fitting very closely at the waist crowd the ribs inward, press on the blood-vessels in the skin, and stifle millions of the body workers. Squeezing the foot into tight shoes injures the bones of the foot, and destroys its beauty.

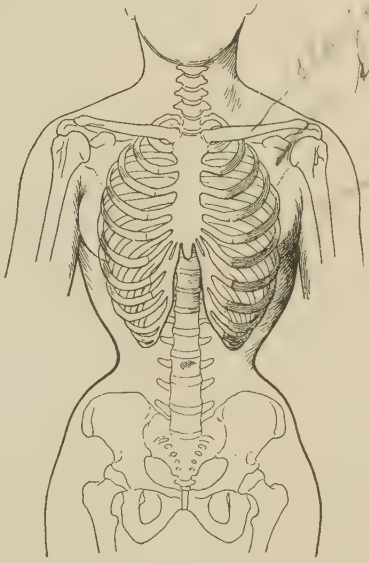
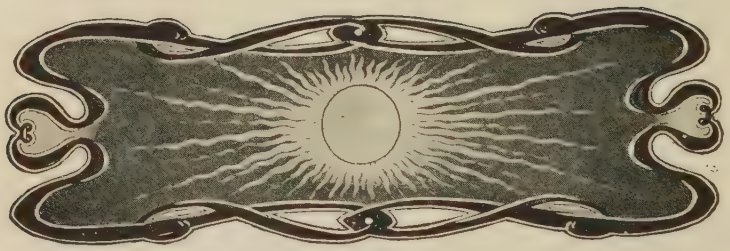


FIG. 17

Deformed by corsets, showing condition of bones in women who habitually wear tight corsets

To keep the framework of the body strong and graceful you must do the same things for the little bone-cells that you do for all the other workers — eat wholesome food, bathe frequently, exercise outdoors, stay in the sunlight, breathe fresh air, take plenty of sleep.

All the cereals, and also potatoes, are rich in food elements necessary to build the bones. The acids of fruits are also important. Children fed on a poor diet grow very slowly, and their bones are often deformed for life.



CHAPTER III

The Muscles

7. About one-half of the total weight of the body is made up of muscle. The muscles constitute the lean meat, or flesh, as distinguished from nerves, bones, fat, sinew, and vital organs. The muscles cover the bones in such a manner as to give the greatest strength, protection, symmetry of form, and grace of movement. No movement of the body can be performed without muscles, hence these, together with the bones and ligaments, constitute the organs of motion and locomotion.

8. *Voluntary Muscles.*— The muscles attached to bones, and used to produce motion, are voluntary muscles, or those that are to a large extent under the control of the will. The voluntary muscles vary in form and size. A simple and common type of muscle is the spindle shaped. There is a large central portion called a belly, and two tapering extremities, which are attached to bones. These attachments are called the origin and the insertion of the muscle. The origin of a muscle is the point from which it acts, and is the most fixed point. If on the limb, it is the end nearest the body. The insertion is the part acted upon, hence the most movable part. A muscle is made up of many small bundles of fibers, which, in turn, are made up of muscle-cells about one inch long and one five-hundredth of an inch in diameter. Each muscle-

cell is connected with a delicate nerve-fiber, so that when the muscle contracts, all its cells contract together.

9. *How a Muscle Contracts.*— No muscle in the body under normal conditions contracts unless it receives an impulse over a nerve, but a muscle may be made to contract by a blow, by heat, by electricity, or by some chemical substance. Impulses are constantly being sent to the muscles, so that they are always on a slight tension, ready for immediate action. When a muscle receives a strong stimulation, all its cells are shortened, and the muscle changes its form, becoming shorter, thicker, and harder. The longer a muscle is, the longer the contraction time; and the thicker it is, the stronger and quicker the contraction in performing work.



FIG. 18
Front view of muscles of thigh and leg

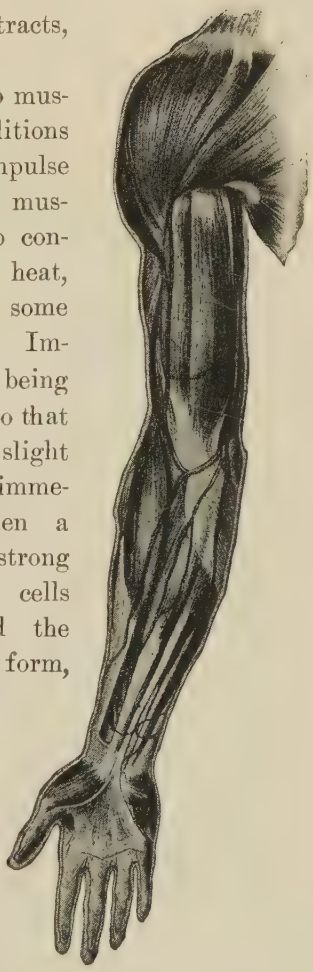


FIG. 19
Front view of muscles of shoulder, arm, and forearm

10. *Involuntary Muscle.*— This type of muscle is not under the control of the will, but receives its nerve supply from the sympathetic system. Involuntary muscle is

found in all the hollow organs, such as the heart, the blood-vessels, the alimentary canal, and in other parts.

11. One peculiar feature of involuntary muscle is the rhythmical contraction ever taking place. In the stomach and intestines this is called peristalsis. The rhythm is slow, but it continues night and day.



FIG. 20
Biceps muscle

12. *Important Muscles.*— The muscle that raises the arm from the side is called the deltoid; the arm is bent by the biceps, and straightened by the triceps, and is drawn over the chest by the pectoral muscles. The diaphragm forms the partition between the chest and abdominal cavity, and is one of the principal muscles of breathing. The abdominal muscles form another important group of muscles, which serve in all expulsive movements, and to keep the stomach and other abdominal organs in place. Two important muscles in the back are the latissimus dorsi and the erector spinæ, which serve to keep the trunk straight. At the hip are the gluteal or hip muscles, which keep the body erect; in the thigh are the sartorius or tailor muscles, and the muscles that straighten the leg. The important muscle that raises the heel is called the gastrocnemius.

13. *Physiology of Muscles.*—When it is desired to move, an impulse is sent from the brain to a muscle. In every little muscle-cell a small spark, so to speak, is produced by this impulse. This little spark ignites food stored in the muscles, and so a series of explosions takes place, causing the muscle to move or to work, and heat also is generated. In fact, eighty per cent of the heat formed in the body is generated in the muscles. So the energy liberated in the muscle is converted into work or into heat.

14. The muscles are abundantly supplied with blood-vessels, for they can hold one-fourth of the total blood of the body. During muscular action, the blood flowing to a muscle is increased, for the arteries are so placed that they are not pressed upon during contraction. It is different, however, with the veins. When the muscle contracts, the venous blood is squeezed out of it.

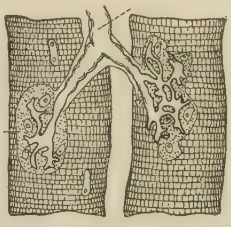


FIG. 21
Nerve endings in muscle-fibers

Muscular action causes cells to break down, and then by increasing the flow of blood through the muscles, it carries away poisons that have accumulated in the tissues, hence the general waste of the body is increased by work. Work hastens the process of repair by increasing the flow of blood to the muscles, producing a more healthy condition of these structures.

15. *Fatigue.*— As soon as a muscle begins to work, fuel is burned to supply the necessary energy. When we build a fire, the wood or coal gives off energy in the form of heat, but ashes accumulate in the fire-box. In a corresponding way, waste accumulates in the muscle more rapidly than it is carried away in the blood. These substances are poisons, and in time lessen the ability of the muscle to contract, by poisoning the end of the nerve where it comes in contact with the muscle-cell. We interpret this feeling as fatigue, or being tired. If the muscle is relaxed, the blood carries the waste away, new material is supplied, and the muscle is rested. After very violent or continued exercise, all the muscles feel tired, and even sore, because of the accumulated poisons. Bicycle riders frequently complain of this. By means of a hot bath at 110° for ten minutes, and then at 100° for twenty minutes, these poisons are carried out of the muscle, and the tired and sore feeling disappears.

16. *Hygiene of Muscles.*— Activity is one of the funda-

mentals of life. A healthy muscle needs the most wholesome food to keep it in repair. Men training for some special muscular contest feel the necessity of a carefully selected dietary. One of the most essential requisites for good muscles is exercise. If a muscle is not used, or remains idle, it wastes away, becoming soft and flaccid, and may be so neglected that repair is impossible.



FIG. 22
Diagram showing some of the muscles which keep the body erect.

On the other hand, if exercise be carried to the point of exhaustion, the waste is so much greater than the repair that the muscle suffers. Periods of rest are just as essential to good muscles as is exercise. Fresh air and sunshine are very necessary factors in building up strong, healthy muscles.

17. *Exercise.*— The principal object to be attained by exercise is not to develop large muscles that are a burden, but to develop endurance, dexterity, grace, symmetry, and to increase the general tone of the entire body. Exercise should be uniform, so that all parts of the body will be proportionately developed. Violent exercise is never in place, and especially is this so in growing boys and girls. Exercise should be graduated to suit the individual needs, and not carried beyond the point of fatigue. Frequent intervals of relaxation are necessary. Those leading a sedentary life, or doing chiefly mental work, are in special need of exercise; this is best taken after meals, and in the evening. With brain workers a little exercise just before retiring renders sleep much more refreshing and sure.

18. *Forms of Exercise.*— No arbitrary rule can be formulated as to the form of exercise or the amount that should be taken. A

growing baby is in constant motion during its waking moments. Arms, legs, and body are all going at the same time. This is necessary to the growth of the child. After walking is possible, the child uses some group of muscles every minute until sleep brings repose. The exercise is uniform, moderate, and suited to the special needs of the child. The cat, the dog, the lion, and the tiger all have strong muscles and endurance due to natural conditions. Exercise not only develops the muscles, but it also develops the bones, the nerves, and the brain.

Walking is one of the best forms of exercise. It is moderate, can easily be regulated in every way, requires no expense, and is by far the most natural method. Experiments show that a person walking six miles an hour inhales seven times more air than one who is in the recumbent position. Walking increases the pulse rate, strengthens the respiration, sharpens the appetite, renders sleep more refreshing, and improves one's mental attitude toward his surroundings. In heart-disease graduated walking in climbing a hill or a mountain is a very successful method of strengthening the heart.

Swimming develops especially the muscles of the back, the arms, and the legs. It is a wholesome form of exercise, prevents spinal curvatures, and helps in overcoming deformities. Rowing, bicycle riding, tennis, and golf are all wholesome forms of exercise.

19. *Work.*— A man who earns his bread by the "sweat of his face," as a rule, needs but little instruction on exercise. Work that will produce sweating is a blessing. By careful planning, the daily program may be so arranged as to give sufficient exercise, and yet have the time well employed.

Working in a garden, mowing the lawn, splitting or sawing wood, visiting the sick, doing errands of mercy, furnish the most exhilarating forms of exercise. The mind is refreshed and satisfied with the consciousness of having done

some worthy work, and this mental state reacts upon the body in the most beneficial manner.

Household duties may be so arranged as to afford all the exercise necessary to health, without interfering in the least with important work.

"Exercise undertaken for the carrying out of some worthy purpose — a purpose in which the mind is deeply interested and the whole man engaged — is the most healthful exercise."



CHAPTER IV

The Nervous System

THE BRAIN AND ITS FUNCTIONS

20. When it is remembered that it is only through the instrumentality of the nervous system that we are able to see, feel, hear, taste, smell, talk, breathe, eat, digest and assimilate food; that we think, reason, love, possess happiness, enjoy emotions and sensations; and that in the brain are stored all the memories and recollections of a lifetime; that it is only through the brain that God can communicate with man and make possible character formation,— this part of the human habitation at once becomes a subject of paramount interest.

Cathedrals, temples, arches, columns, stand to-day as monuments to the genius of man. But more wonderful than temple erected, arch lifted, or column decorated, is the architectural design of the human brain. Here we have columns and pillars, chambers and galleries, decked with fringed and lace-like curtains; wonderful passages, and a most intricate labyrinth of pathways, untrodden and mysterious.

21. The spinal cord and nerve trunks are simply projections of the brain, and so must be regarded as a portion of the brain. Examined with the eye, the brain is grayish or silvery in appearance, double in form, made up of numer-

ous convolutions, with intervening depressions, on the whole resembling the kernel of a walnut; examined with the microscope, it is seen to be made up of millions of cells and innumerable fibers running in every direction. The cells are the receiving and the transmitting centers, while the fibers are the electric wires, carrying messages back and forth from the different parts of the brain, or from remote portions of the body.

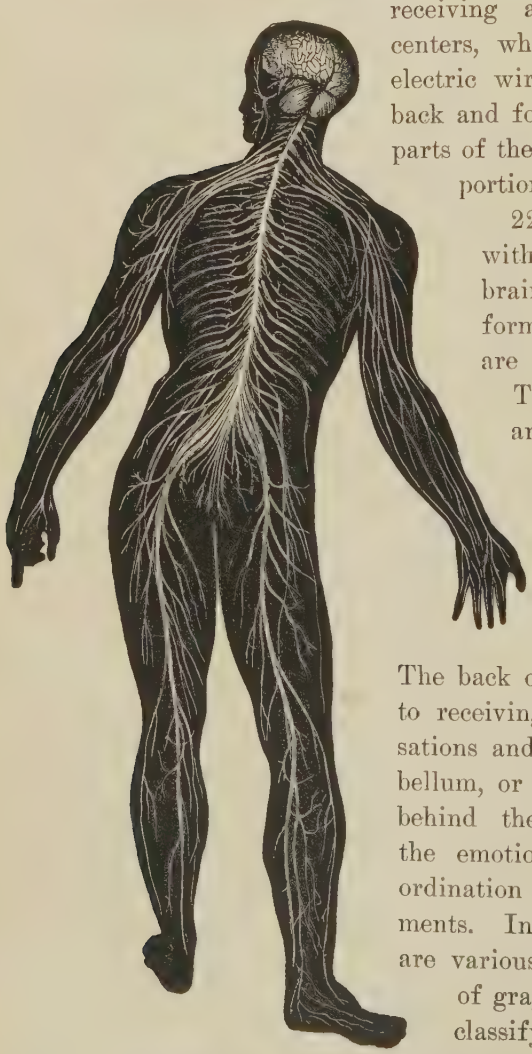


FIG. 23
The nervous system

22. Roughly speaking, with the front third of the brain we think, reason, formulate perceptions, and are conscious of being. The high moral faculties are doubtless located in this portion of the brain. The middle third of the brain is the center for the performance of voluntary movements. The back of the brain is devoted to receiving and storing up sensations and memories. The cerebellum, or little brain, below and behind the ears, presides over the emotions, and over the coordination of all voluntary movements. In the base of the brain are various centers or collections of gray cells that receive and classify all sensations, preside over involuntary movements,

such as breathing, the heart-beat, digestion, vomiting, sneezing, and regulating the furnaces of the body, increasing or diminishing the production of heat according to the individual needs. In the spinal cord are other reflex centers that may act, so far as we know, independently of the brain centers.

23. The surface of the brain (Fig. 26), is wrinkled and folded upon itself, like a ruffle, forming elevations called convolutions, and depressions called fissures, that vary in depth and length. This arrangement provides an extensive surface, four square feet in area, compactly placed within a small cavity. This is man's thinking area. The more fully the brain is developed, the longer and deeper are the fissures, the thicker and more dense is the gray matter, and some authors claim the convolutions are more numerous.

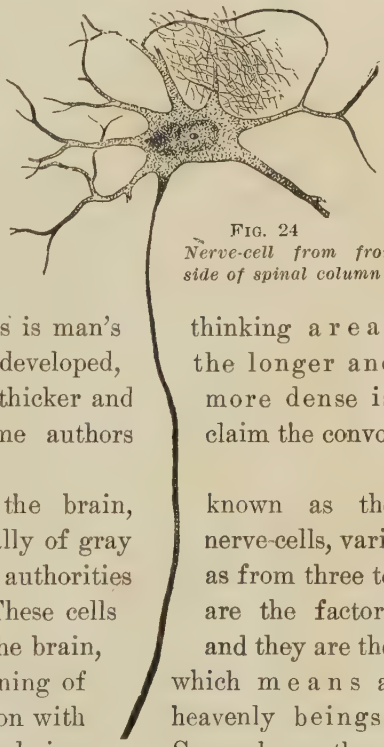


FIG. 24
Nerve-cell from front side of spinal column

The outer surface of the brain, known as the cortex, is composed principally of gray nerve-cells, variously estimated by the best authorities as from three to nine billions in number. These cells are the factors of interest in the study of the brain, and they are the little bodies the proper training of which means a character fitted for association with heavenly beings. Nerve-cells vary in shape and size. Some have three or four branch-like projections, and some possess so many branches and arms as to remind one of the luxuriant foliage of a tropical forest. (See Figs. 24, 28, 29, 30, 31.) Some of these cells are so small that four thousand placed side by side would barely make an inch; others again are about one two-hundredths of an inch in diameter. Though these cells

are so small, no two of them are in direct contact except when acting. Each cell is surrounded by a delicate film of lymph, which separates it from its fellow. Not only this, but the brain as a whole is completely surrounded by fluid, and rests upon a cushion of fluid.

These microscopic cells have three or four or more branches (Fig. 28), which we may say are a sort of feelers, and they are covered all over with little projections, by means of which contact is made with other cells. Most of the nerve-cells have one long, delicate, slender, silvery branch, finer than a silk fiber. (Figs. 24, 29.) This is a nerve-fiber, and many of them make a nerve. It is very interesting to know that each nerve-fiber is covered with a fatty substance that insulates it so that an impulse can not pass from one nerve-fiber to another, and so cause confusion. (Fig. 25.) Some of these nerve-fibers are very long, extending from the surface of the brain to the lower end of the spinal cord; others reach from the spinal cord to the toes. The nerve-fiber ends in a little brush-like extremity, by means of which it makes contact with the next cell. (Fig. 30.) In every motion we make, and in every sensation we receive, at least two nerve-cells must participate. The nerve-fiber always carries an impulse away from the cell body, while the many short branches carry it to the cell. The number of brain-cells does not increase from year to year, but the individual cells grow in size. Professor Donaldson, of the University of Chicago, claims that some nerve-cells may be increased in volume ten thousand times.

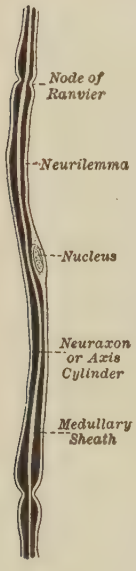


FIG. 25
Nerve-fiber

24. The nerve-cells are arranged in layers and groups, each group being concerned with some particular function. Each of the special senses is associated with cells that are solely

occupied with that one function. One group of cells stores up impressions received through the eye; another remembers spoken words, or a beautiful song; another correlates ideas; one group forms the speech center, and by association with the cells of sight, hearing, or other memory areas, by means of nerve pathways, enables us to speak. By this means one is able to talk of things he has seen or heard, or of past events.

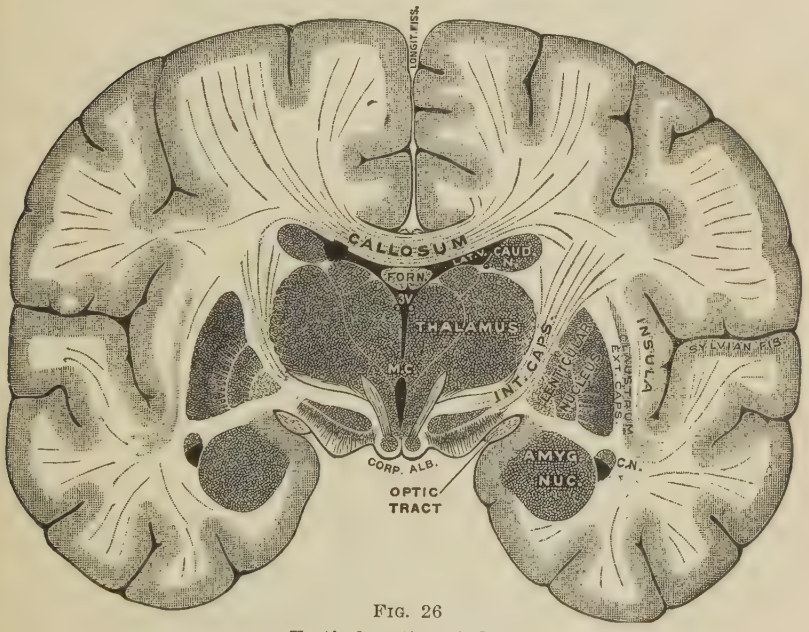


FIG. 26
Vertical section of the brain

The various groups of nerve-centers may appropriately be compared to the central telegraph office in a large city, where all the instruments are kept constantly clicking, thousands of messages being received and sent out every hour. (Fig. 32.) Happily, every message received in the brain does not require an answer, for if it did, one would be in a constant state of convulsion. Nerve-cells are reservoirs of energy. They are capable of withstanding a certain amount of irri-

tation from stimulation: but when this irritation reaches a certain limit, inhibition, or self-control, gives way; there is an explosion, so to speak, in the nerve-cell; energy is liberated, which flows over a nerve trunk, and acts upon some



FIG. 27

A brain picture — (A) Ray of light from music to the eye, (A) visual center, (B) intellectual center, (C) will, (D) motor center for the arm, (E) motor center to the hand, (F) to which an impulse travels, (a) represents musical sounds passing through the ear to the auditory center (G), which is associated with (b), and the musical center (H), and from there to (B), where sounds [illegible] may be analyzed and [illegible]

part of the body. In a child this may be a convulsion. In a hysterical person it may be a fit of weeping or contortions of the body.

25. Thought, emotion, and action travel over well-defined pathways of the nervous system, and each is the result of the activity of different cells. The landscape is focused upon the retina of the eye, where a minute image is formed. From there it passes back over the optic nerve to the point where the two nerves unite; at this point the nerve-fibers cross, the image pictured on the nasal side of the left eye crosses over to the right side of the brain, while the image formed on the outer side of the eyeball, passes back on the same side of the brain. From the point of crossing of the nerve the image passes still backward over the optic tract at the base of the brain, curving outward, then upward and inward, ending in three enlargements, called the optic thalamus, the external geniculate bodies, and the anterior corpora quadrigemina; from these bodies new fibers carry the image to the cortex in the back part of the brain, where it becomes stored in memory.

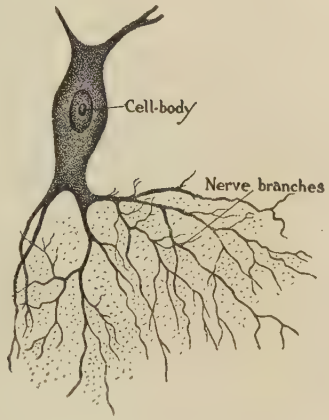


FIG. 28
A nerve-cell with bush-like projections

A sound travels through all the labyrinth of the ear, over the auditory nerve, into the medulla oblongata, then upward to the base of the brain through the optic thalamus to the opposite side of the brain to a place in the cortex that corresponds approximately to a point on the head just a little behind the tip of the ear. Motion is produced by an impulse traveling from the cortex of the middle third of the brain entirely through the middle of the brain to its base through

the pons varolii, and the medulla, in the lower part of which it crosses to the opposite side, down the side of the spinal cord, ending in a brushlet connecting with a motor cell in the front part of the cord. This cell, in turn, sends the impulse along a nerve to the muscles.

A considerable portion of the cortex of the back part of the brain is devoted to memory. There can be no doubt that each individual nerve-cell, or neuron, may be said, in an accommodated sense, to remember. All such neurons are sensory, and are the reservoirs for the multitudinous sensations pouring into the brain. When a nerve-cell receives an impression, a change is produced in its vital portion. A molecular transformation takes place in its granules. Neurons receive impressions over a nerve by means of waves of energy, or vibrations. These vibrations set up molecular motions in the granules of the cell body, and leave a lasting impression, but no one can tell how this is done.

By careful experiments and delicate methods of preparing brain tissue, scientists have thoroughly demonstrated that the neuron possesses the power of putting out the dendrites, or its many branches (Figs. 28, 30), as little feelers, establishing a connection with branches from other cells. This contact of cells probably takes place by means of the little thorn-like projections, or gemmules, by which they are covered. When contact between neurons is made, a current of nerve energy circulates in the same way as an electric current flows when

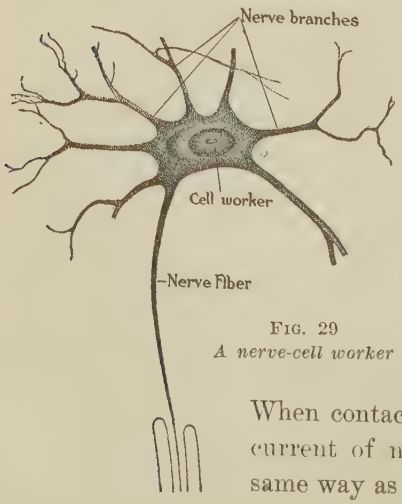


FIG. 29
A nerve-cell worker

connections are made with the battery. The dendrites may retract and sever connection with other cells, in which case the current is broken. The contact of the projections of the neurons explains the peculiar mental activity of one in immediate danger, as of drowning. The excitement is so intense that every brain-cell is aroused, and all its connections are made, so that the events of a lifetime pass in panoramic view before the mind in an instant.

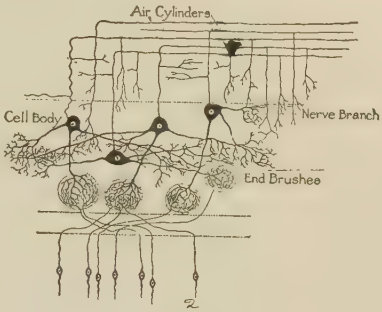


FIG. 30

A diagram showing the manner in which nerve-cells make contact with each other

At times it is difficult to recall a fact, and we often give it up in despair. But in response to our effort, "tracers" have been sent out after it by the mind, and a good many cells are "called up." In this process the right neuron may or may not be discovered.

An interesting illustration of the operation of the memory cells was seen lately in a hospital patient. A man nearly seventy years of age, a foreigner, who had left the fatherland when he was ten years old, and had never used his native tongue since leaving, while on his death-bed, oblivious to his surroundings, repeated whole chapters of the Bible in his native tongue.

A similar instance was that of a woman in her ninety-sixth year, who, for a week before her death, lived over again her girlhood days. She seemed to be in school. She repeated little verses, the multiplication table, spelling lessons, and engaged in child talk. Memories of past events of seventy or eighty years' standing came into her mind as the dormant brain-cells became aroused.

There is, therefore, a physiological basis for memory.

Things are best remembered when the entire attention is absorbed, and the whole brain energized. The more neurons affected by each impression, the more lasting it will be, and the more readily it can be recalled.

When one is tired or exhausted, mentally or physically, he can not remember perfectly. When a nerve-cell is tired, it loses its regular outline, diminishes in size, draws in its processes and projections, and breaks communication with other cells. Fatigue causes poisons to accumulate in the brain, and paralyzes these little feelers, rendering them incapable of action, thus preventing the recalling of mental pictures necessary to memory. Alcohol acts in like manner. It first irritates the cells, and increases their activity; this is quickly followed by a reaction, paralyzing the little dendritic processes, destroying the gemmules, and causing the nerve-cell to shrink. Some cells are affected more than others, thus producing inco-ordination of both movements and speech.



FIG. 31
A type of nerve-cell

There are several theories advanced to account for sleep, but the one that has the largest following, and that appeals most to reason, is based upon the condition of the neurons. Consciousness is due to a definite state of the brain-cells, and any departure from complete consciousness must be due to some change in these cells. During sleep the cerebrum is functionally at rest, while the reflex centers maintain the vital fires, stimulate the breathing apparatus, make the heart beat, digest and assimilate food. During this time the brain is itself being repaired and renovated, but exerts very little influence upon the general system. There is a retraction of the dendritic processes, and a consequent inability of the nervous impulses to pass from one cell to another. When a telegraph wire is down or has been cut, no message can be sent into the office; so during sleep ordinary stimuli do not

reach the brain, for the neurons have drawn in their feelers, and are at rest. At times certain cells or groups of cells are in a state of agitation, and the will, or inhibiting centers, being at rest, these cells keep at work, without order or system, and so sleep is disturbed by dreams.

Nothing is more destructive to the brain-cell and its projections than worry. It is said that this destroys brain-cells beyond all repair. Fear is akin to worry, and, like it, interferes with every mental process. Both, by their action on the nutritive centers of the brain, produce disturbances in all parts of the body. Food is badly digested, circulation is sluggish, the blood-vessels are contracted, the nerves are on a tension, and the ebb and flow of vital force is lowered.

The influence of the mind increases the activity of the brain-cells, and is a powerful factor in therapeutics. In hysterical paralysis there is a separation of the neurons by a retraction of the dendrites. Simply by inspiring the patient with confidence, even in some absurd thing, the motor cells are made to establish communication, and the patient is cured.

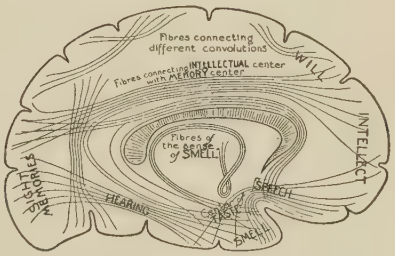


FIG. 32
Diagram showing the important centers in the brain and their associations

Anger has a paralyzing influence on the brain-cells, producing a veritable intoxication. The author was called to see a woman, sixty-five years of age, unconscious, and paralyzed on the right side of her body. The day before she had had a dispute with another woman, during which she became violently angry, flying into a rage and stamping her foot. In the midst of her passion she gave a shriek, and fell to the floor in an unconscious condition. She never regained consciousness, and four days later died. The autopsy revealed a ruptured blood-vessel with a large clot of blood pressing on

the motor area of the left side, hence the paralysis on the right side of the body.

A new line of thinking is always difficult, because new cells are called into use that are unaccustomed to any psychic process; furthermore, new avenues of communication must be cut through the underbrush — the meshwork of unused nerve-cells and branches. Neurons unused to work must be developed and educated. When a thought becomes a matter of routine, it ceases to develop the brain.

When any faculty of the brain is allowed to lie idle, the brain-cells atrophy, or waste and shrivel. They may lose their entire function. In every realm, nature withdraws her gift from him who neglects or misuses it. It is said that unused vision caused the blindness of the mole and of sightless fish. If a muscle is neglected, as when the arm is bound to the side, it speedily atrophies, or wastes. In the same way any part of the brain will lose its vigor if not exercised. Darwin in early life was exceedingly fond of music and poetry, but his career of active scientific life soon led him away from these esthetic pursuits, and he was lost in forest and field for more than a score of years. He gave all his strength to the study of flowers, trees, seeds, roots, birds, animals, and insects. At fifty he found his love for poetry and music had faded away. In his last days he said that if he could live his life over again, he would make it a rule to read some poetry every day, and to listen to music at least once a week; for he felt that these centers in his brain had atrophied through neglect, and that this brain waste involved a loss of happiness, as well as an injury to his intellectual and moral character.

Habits are formed in the same way that one learns to walk. Thought and action flow along the lines of least resistance. When well-beaten psychic pathways are once made, a habit is the result. In order to break up that habit, new brain-cells must be aroused to action, and new fibers employed; then the old cells waste and die from non-use. The older one grows,

the more difficult becomes any change of cell activity, hence any change of habit.

When a child is born, it begins life with a brain that may be likened to an exceedingly sensitive photographic plate that is about to be exposed. The picture may be beautiful or ugly, according to the environment and surroundings. The baby has no memories, for it has had no communication with the outside world. It stares vacantly about, has no appreciation of distance, does not recognize any particular sound, taste, or touch. When sufficient time has elapsed for the brain neurons to store memories of yesterday, intellect begins to dawn in the infant brain, and distinct likes and dislikes are formed according to pleasure or pain. The first few months are spent in acquiring physical habits, and in developing the motor portions of the brain. The child soon learns the meaning of words, but it is a long time before it can articulate, for this is a very complicated process, necessitating the co-ordination of all the muscles of the tongue, lips, face, and jaw, together with a co-ordination of the memory, speech, and auditory centers, with the motor speech center. Speech depends upon a memory of words.

The possibilities that lie within the three billion cells of the brain are infinite. We may dissect sections, trace fibers, locate centers, analyze neurons, but we can not locate thought. We can analyze the sound wave, show how it passes into the ear, communicates energy to the ear-drum, sets the ossicles vibrating, produces a commotion in the labyrinth of the internal ear, passes over the auditory nerve into the medulla oblongata, and from there into the cortical cells of the temporal region; but how a physical property can be converted into consciousness is just as inexplicable and mysterious to-day as it was a thousand years ago.

The little knowledge that we have gained of the brain is enough to make every act or emotion or thought appear momentous. The brain is the battle-ground of character. Every instant since we were born the neurons have been storing

impressions with or without our consent, to be used by the will for or against our character. Here the greatest battles of the ages are fought. When we look through the "mind's eye," we gaze upon the battle-ground. Sleeping or waking, the struggle is always going on. Death closes the conflict. Character is the result.

26. *Cerebellum.*— This (the "lesser brain") is the back part of the brain, under the cerebrum, which it resembles. It is made up of gray and white matter, presides over the co-ordination of muscular movements, helps us to maintain muscular equilibrium, and is thought to preside over our emotions.

27. *Pons Varolii.*— This part is well named, for it is a bridge of fibers from one side of the cerebellum to the other, and from the cerebrum to the little brain.

28. *Medulla Oblongata.*— This is the part of the brain that gradually blends with the spinal cord. In it are the centers that control the important functions of respiration, circulation, and perspiration, and here we also find the centers of most of the cranial nerves.

29. *Spinal Cord.*— This is the round column of nerve substance about eighteen inches long extending down in a special canal in the spinal column.

It is composed of white and gray matter. The white matter is on the outside of the cord, and consists of nerve-fibers which run to and from the brain. The gray matter is in the middle portion of the cord, and is made up of cells which connect with the white fibers. The front part of the spinal column is motor in function, and transmits impulses from the brain to the muscles and organs. The back part of the cord is sensory in function, and carries all the impressions from all parts of the body below the head to the brain.

Twelve pairs of nerve trunks, known as cranial nerves, are given off from the base of the brain, and thirty-one pairs of spinal nerves are given off from the spinal cord.

Each spinal nerve is made up of fibers, called motor fibers, that come from the front part of the cord, and of fibers, called sensory fibers, that come from the back part of the cord. These unite and form a common nerve trunk, which is then distributed to the muscles and the skin.

So each nerve trunk carries impressions both ways, but no nerve-fiber or nerve trunk can generate or originate an im-

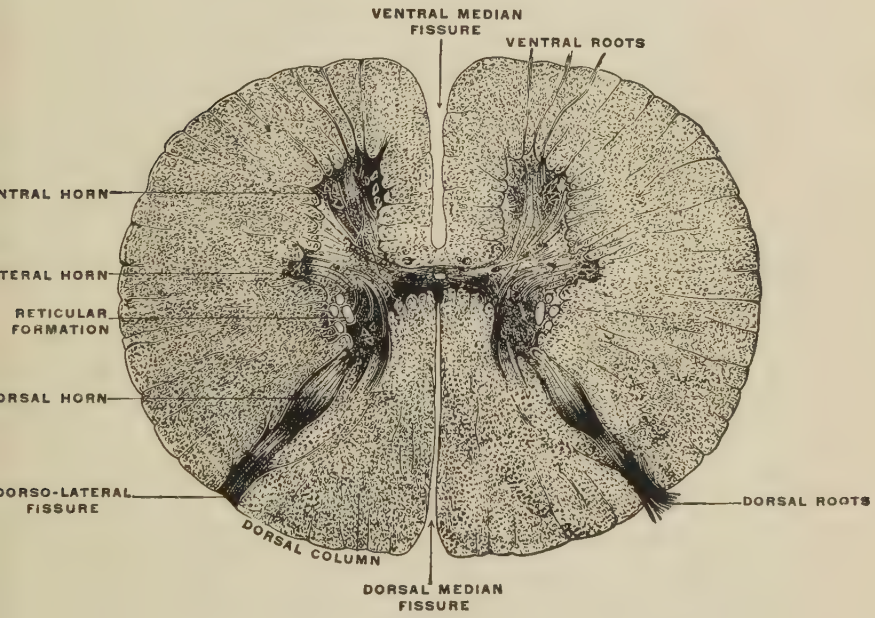


FIG. 33
Section of the spinal cord

pulse. The impulse must come from the cell or from groups of cells. Each pair of cranial and spinal nerves is connected with the sympathetic system.

30. The cranial nerves are: —

a. The *olfactory* nerves, special nerves of smell distributed in the nasal mucous membrane.

b. The *optic* nerves, the special nerves of sight.

c. The *oculomotor* nerves, the motor nerves of the eyeball.

d. The *trochlear* nerves, controlling the superior oblique muscle of the eyeball, turning the eyeball obliquely upward.

e. The *trigeminal* nerves are both sensory and motor. They supply the face and the scalp with sensation, and the motor division goes to the muscles of mastication.

f. The *abducens,* supplying the muscle that turns the eyeball outward.

g. The *facial,* the motor nerve that supplies all the muscles of expression in the face. One branch, the corda tympani, goes to the tongue.

h. The *auditory* nerves, the special nerves of hearing. The *cochlear* branch goes to the cochlea, and the *vestibular* branch is distributed to the semicircular canals, the saccule and utricle.

i. The *glossopharyngeal,* the special nerve of taste. It also sends branches to the pharynx, the palate, the tonsils, and to the Eustachian tube.

j. The *pneumogastric,* or *vagus* nerve, the longest and most widely distributed of all the cranial nerves. It is both sensory and motor. It sends branches to the pharynx, larynx, esophagus, the trachea, and bronchi, the lungs, pleura, heart, stomach, liver, spleen, and intestines.

k. The *spinal accessory,* a motor nerve, supplying muscles in the neck.

l. The *hypoglossal,* the motor nerve of the tongue.

HYGIENE OF THE NERVOUS SYSTEM

31. It is well known among physicians that nervous diseases are markedly on the increase. Mental diseases, insanity, nervous prostration, and other functional diseases of the nervous system are increasing at such a rapid rate that we look with alarm upon the future of the race.

Nervousness is no indication of a delicate and refined nature. It is a diseased state. It is a weakness, the indulgence of which is the cause of untold misery in the world.

Nervousness indicates a lack of self-control of the higher nerve-centers in the brain and spinal cord. When self-control predominates, nervousness can always be kept in abeyance. When a nerve-center is exhausted from overstimulation or from lack of proper nutrition, self-control is impossible. Hence the maintenance of a healthy nervous system lies at the very foundation of abounding health and endurance.

For this reason the delicate brain and spinal cord, with all the nerve-centers, are carefully protected and guarded in many ways. Anatomists are acquainted with the fact that the nervous system is one of the last tissues to waste in the dead body. Physiology shows that this is true with the living body. The nervous system is maintained at the expense of other tissues and organs.

32. *The Blood.*— A healthy nervous system in the first place depends upon healthy blood and upon a healthy circulation. Every individual nerve-cell depends upon pure, wholesome food, pure air, sunshine, pure water, and active eliminative organs, such as the skin, the kidneys, and the bowels.

Blood that is charged with poisons produced in the body can not properly nourish the nerve-centers. These poisons irritate and exhaust the nerve-cells, and are a very common cause of nervous prostration. Under the most favorable conditions enough poison is produced in the normal body in eight hours to destroy it.

33. *Food.*—The nervous system is the most highly organized of all the organs of the body. It therefore requires food of the highest and best quality to nourish it properly, and to rebuild the waste that takes place from wear and tear. Such food will be found among cereals, vegetables, nuts, and fruits. The process of digestion is a slow one, therefore food should not be precipitated into the stomach with great haste, washing it down in order to hasten the process of swallowing. Food should be retained in the mouth until it is thoroughly masticated and insalivated.

Poorly cooked foods, hastily eaten, overtax the powers of the stomach, intestines, and liver, and as a consequence consume much nerve-force that ought to be stored in muscles and nerve-cells for future service.

When the brain is exhausted from too close mental effort, it should be rested before one partakes of a hearty meal. This principle applies to all kinds of fatigue. In such a state the stomach is too exhausted to act properly upon food.

34. *Sleep.*—No one condition will rest, refresh, and restore nerve-cells like sleep. On the other hand, nothing will exhaust the nervous system so effectually as the lack of sleep. One will die much sooner from loss of sleep than from the absence of food. One way the Orientals have of punishing a criminal is to make him walk between two soldiers, who are frequently relieved, for several days without sleep.

During sleep all the vital processes are slower, and the nervous activity is greatly diminished. Nearly all portions of the brain are at rest. But few impulses travel to the brain. If sleep is sound, there are fewer reflexes. Breathing is slow; the heart is less rapid; in fact, the body is laying in a supply of oxygen, and storing up energy for the morrow.

Loss of sleep gives rise to a pale appearance; for the blood is not sufficiently supplied with oxygen. Sleep is the greatest restorative power of the body.

A new-born child sleeps nearly all the time. A child under two years old requires from twelve to sixteen hours' sleep out of the twenty-four. A growing boy or girl requires at least ten hours'. The average adult will be healthier and have a stronger nervous system if he takes eight hours' sleep. The aged require less sleep, for all the vital processes are slower.

Experiments show that material changes occur in a nerve-cell when it is stimulated. It becomes smaller, more irregular, many of its granules disappear, and its nucleus seems shrunken. During sleep these cells are recharged, so to speak, and are restored to their normal condition.

In order that nerve-cells be properly restored, sleep must be continuous. Sleep taken in snatches, or frequently interrupted, is much less restorative, even though the usual amount be taken.

35. *Mental Work.*—The brain is the great nutritive center of the body. By its action the entire body is energized. Hard brain workers possess greater vitality than those who labor with their muscles. This is also demonstrated by the fact that brain workers are longer lived.

No one ever died from overwork of the brain. It is the neglect of exercise, rest, sleep, and sufficient time for eating, that causes the brain worker to succumb to disease or to nervous prostration.

Mental concentration causes a large amount of blood to accumulate in the brain. At night this excites the brain-cells, and often the brain continues working, though the mind is weary, and sleep is desirable. All mental effort should be regular and systematic. It should not be too long continued without proper periods of rest and exercise, or muscular diversion. Mental effort as a rule involves only certain centers of the brain, and rest may be obtained by a change of brain work.

Concentrated brain work at bedtime is very apt to be followed by unrefreshing sleep. At such times a prolonged neutral bath at 95° will induce normal sleep.

36. *Character.*—In the Bible we read: "For as he [man] thinketh in his heart, so is he." This is the sum of his character. Our thoughts are based upon the things we have seen, heard, touched, tasted, and smelled — upon memories stored in the nerve-cells. So there is a physiological basis for character.

Every man is a bundle of habits. Habits are unconscious acts that control us, due to frequent repetitions of conscious efforts. The first time any new movement is attempted, the entire attention of the mind is required. This is also true of

any new line of thought, and is due to the fact that new brain-cells have to be trained. In time they will preside over these movements or thoughts, and the higher centers of the brain will be free to think along new lines. The first time we drive through the woods, it is difficult. So it is difficult for a new thought to make a new pathway. The second time it is easier, and so on until it has become a habit. Thoughts travel along well-beaten pathways, which, once formed, are not easy to change. A carpenter makes almost the same motions every day; so does a woman washing dishes. We all do, when we dress and when we undress. These are habits, or unconscious acts. The spinal cord can be trained to preside over many movements, and thus leave the brain free to engage in higher thoughts.

It is therefore of the utmost importance that speech, expression, and methods of thinking should be correct from the very first. Every movement should be accurate from the start. When these develop into habits, they will be good ones. The senses must be trained to accuracy from the very beginning.

Such training should begin in early childhood. Nearly all habits of life, such as speech, voice, manner, expression, movements, tastes, and manner of thinking, are formed by the twenty-fifth year. The habits are fixed. While it is not impossible for an individual to change habits after this age, yet it requires much perseverance and patient effort. The saying, "You can't teach an old dog new tricks," has a physical basis.

A boy or girl whose brain has woven into its substance things that are true, and honest, and just, and pure, and lovely, and of good report, has a foundation for character building that will be as enduring as eternity.

"Noble deeds will be inevitable, because of the constantly repeated, voluntary turning of nervous impulses into channels for such results. Acts demanded by great and sudden emer-

gencies, when deliberation and reason are impossible, will be unselfish, wise, and in every way worthy, because previous voluntary action has habituated all the nerve-centers so to respond to stimuli received when judgment and reason have had time to consider."

Children who are indulged, and who are allowed to satisfy the senses simply because it gratifies them, are early taught to live for the mere pleasure of life. They are not taught to say, No, to appetite. Later in life the habit is fixed, and they become a prey to every passion and storm of the soul.



CHAPTER V

The Skin

37. The beautiful house in which we dwell is not only wonderful when viewed as a whole, but every room, every partition, the supporting pillars, the siding, yes, every little cell of which all these different parts are composed, is indeed wonderful. Surely, as the Bible says, we are "fearfully and wonderfully made."

One organ that is most remarkable in design, and that probably has as important a bearing on our lives as does any other member, is the skin. It is the natural adornment of the body; for at the creation it was given to man as the only clothing necessary, and was surrounded by a divine glory. But when man sinned, and his mind became perverted, it was necessary for his body to be clothed, not only as a protection against changes of temperature, but from a moral standpoint. So God made clothes for Adam and Eve from the skins of animals.

The skin is very complex in its structure. It forms the outer covering of the body, adding beauty to every part of the exterior. At the same time it serves as a protection to the inner and more vital parts, while discharging some very important duties. While it closely hugs every part of the body, yet it is elastic, and permits us to stretch, bend, and

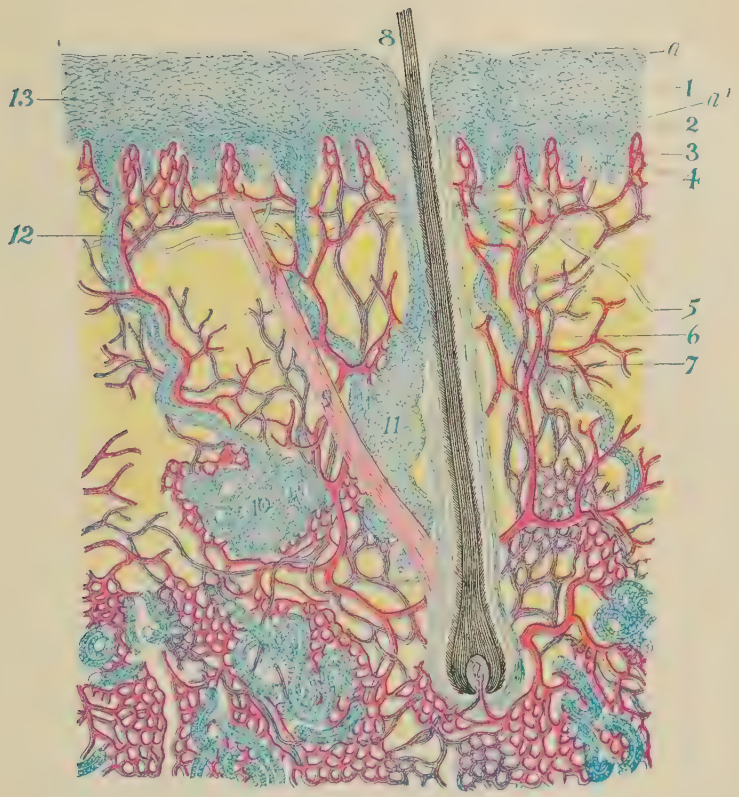


PLATE I. The Skin

Diagrammatic section of the skin, illustrating the different structures

(a) Stratum corneum, (1) stratum lucidum, (a') stratum granulosum, (2) stratum spinosum, (3) upper layer of true skin, (4) touch corpuscle, (5) nerve-fiber, (6) vein, (7) artery, (8) hair, (9) muscle that acts on hair, (10) coil gland, (11) sebaceous gland, (12) duct of coil gland, (13) sweat pore passing through skin.

make a great variety of motions, without its breaking or cracking.

The skin not only covers the body without, but also within. The cavities in the nose, the mouth, and all the internal passages, are covered with skin, though it is of finer texture, and is called mucous membrane.

> "There's a skin within and a skin without,
> A covering skin and a living skin;
> But the skin within is the skin without,
> Doubled inwards, and carried completely throughout."

The lips are red, because they are frequently moistened by the saliva. Sometimes disease makes it necessary to remove a lip, and then a new one is formed by the surgeon from the outer skin. In a short time it becomes red, almost like a natural one.

38. *The Structure of the Skin.*— The area of the surface of the skin varies according to the size of the individual; but it is estimated that there are from fifteen to seventeen square feet of this useful covering to the average adult.

The skin is divided into two general layers,— the scarf-skin, or epidermis; and the inner, or true skin, also called "cutis," or "derma." These two layers are, in turn, made up of other layers, which are easily seen through the microscope. The first is the stratum corneum, or horny layer, marked *a* in the illustration. You will notice that this layer is made up of a great many flat cells. If you look closely at the skin on any portion of your body, you will see that it is covered with little dry scales, which become very abundant if you neglect to bathe for a few days. This layer is continu ally being brushed off from the body by the friction of the clothes, and by bathing. You may ask, Where do the new cells come from to supply this continual waste?

The little cells in the fourth layer are continually dividing and increasing; and as new cells are formed, they are pushed up toward the surface. At first they look like little columns;

but as they approach the surface, they become oblong, and then quite flat, until they look like scales, as we see them on the surface. As these little cells near the surface, they begin to die. They are dead when we see them. They then fall off to make room for others that are following them.

Next is the stratum lucidum (*1*), or clear layer, made up of two or three layers of cells. Under this is the stratum granulosum (*á*), a layer made up of little granules, upon which the color of the skin depends. In the races that have a dark skin, these little granules contain pigment, or coloring matter. So we see that the statement that "beauty is only skin deep" is true; for the color of the skin resides in its superficial layers. Hence beauty is less than skin deep.



FIG. 34
Skin with epidermis stripped off, showing the different layers

The last layer of the epidermis is the stratum spinosum, or the *rete Malpighii* (*2*), the rete being little pegs projecting downward, uniting in a series of interdigitations with the corresponding pegs of the upper layer of the true skin. You can illustrate this by placing the fingers of one hand lengthwise between those of the other hand. This is the most important layer of the cuticle. The four layers described do not contain any blood-vessels, or even lymph vessels, so they are not directly nourished, like the cells in other parts of the body.

If the epidermis should be stripped off, the true skin would

appear as shown in the accompanying illustration. (Fig. 34.) The little projecting bodies are called papillæ (*3*), and form the upper layer of the true skin. They are richly supplied with small arteries, veins, and nerves; and their office is not only to supply nourishment to the epidermis above, but to provide surface for the cooling of the blood, which is brought in large quantities to the surface of the body. The second and last layer (*5*) of the true skin is made up of innumerable interlacing little fibers, loosely held together.

In the true skin there are thousands of little glands that pour out oil upon the skin, and thus keep it soft. Every hair on the body has one of these little glands connected with it, and in this way the hair is oiled. Below the skin are the sweat-glands, and they send up their watery fluid through a spiral tube.

In addition to the many layers of the skin, and the beautiful way in which nature has put them together, there are other interesting structures closely associated with it, which will now be considered. The hair, the eyebrows, the eyelashes, and the finger-nails are all parts of the skin, and develop from it.

The hairs are long, cylindrical threads, or filaments, and are placed in a slanting position in the skin, in what are known as hair-follicles.

The hair covers all portions of the body except the palms of the hands, the soles of the feet, and the back part of the last joint of the fingers and toes. There are several varieties of hairs on the body,— the long, soft hair of the head; the fine, downy hairs that cover the face and nearly all portions of the body; and the short, stiff, pointed hairs found in the eyebrows and eyelashes.

No. 8 shows how the hairs are placed in the skin. Probably many often wonder how it is that a dog or a cat can cause the hair to stand up on its back at will or when frightened,

and what causes the "goose-flesh" to form when we become chilled. A glance at the illustration will tell you why this is. To the left of the hair, you will notice a little band of fibers marked *9*. This is a little muscle connecting the hair shaft with the true skin. It forms an acute angle with the hair. The hairs are in a slanting position, the hair and muscle both slanting in the same way. When a dog or a cat becomes frightened, all these little muscles contract, pulling the root of the hair in the direction of the muscle, and consequently causing the hair to become erect. When these little muscles contract in the human skin, the contraction serves to bring together a number of the little papillæ in the true skin, and these form little cones on the surface, which we call goose-flesh. When in this condition, the skin always looks pale or bluish, as a result of the compression exercised by these hair muscles, driving all the blood from the surface, that we may not become too much chilled.

The illustrations reveal the wonderful structure of a hair when magnified five hundred times. You see that it is covered with a number of coats, or sheaths; close inspection also reveals that the entire hair is made up of little cells. The hair is placed in a small sac, or follicle, where it is nourished by the blood. If the hair drops out, or is pulled out, and the follicle remains healthy, another hair will grow; but if the follicle is destroyed, no more hair will grow out of it, and the hair that is in it will drop out. Each hair-follicle has one or more nerve-fibers.

The shaft of the hair is the portion that projects above the skin. It may be round or flat, straight or curly, the latter condition being due to variations in the degree of flattening. The outside of the hair is covered with numerous flat cells, or little plates, that overlap one another, like the shingles on the roof of a house, or the husk that covers a pineapple. If you rub a hair between the thumb and index-finger, it will always move away from the root. In this way, if a hair is divided

into several parts, you can always tell on which end the root was.

The shaft of the hair is not solid, but has a little canal in its center, like a straw, only very small. This is full of air. The color of the hair depends upon the pigment, or coloring matter, contained in the hair-cells, and the amount of air in the canal of the shaft. The variation of these conditions gives shades from snowy whiteness to ebony black.

In the illustration you will notice (*11*) a collection of cells between the hair shaft and the hair muscle. This is the little sebaceous gland, that contains an oily substance, the function of which is to anoint the skin and hairs. When the muscles contract in the skin, these little glands are pressed upon, and their secretions are poured out upon the skin. This oil prevents the loss of too much heat from the body when the skin is chilled.

39. *Functions of the Skin.*—From this description it is clear that the skin is a wonderfully complex organ. But when we think of the many important offices that are fulfilled by it, the mechanism that is constantly adjusting itself to meet all conditions of life and its environments, we can readily see how it required a divine mind to originate it. Man can not imitate it in the slightest degree. An acquaintance with these intricate structures leads us to exclaim, "O Lord, how manifold are thy works!" and to heed the admonition, "Remember his marvelous works."

The skin is one of the most sensitive structures of the entire body, being influenced by even the slightest shade of variation in temperature; and by its automatic, or self-regulating, mechanism it adjusts itself to these changes immediately, in the fraction of a second. How quickly a cold chill may pass over the body, or how suddenly a hot flush may sweep over the entire surface of the skin! In less than a minute little beads of perspiration stand out on the face or forehead, or some other portion of the body. This is due to the fact that

the skin is under the control of the nerves, and these act with lightning-like rapidity. This action of the skin is a wise provision of nature, and it leads us to the consideration of its first and most important function.

40. *The Regulation of Temperature.*—The normal, or natural, temperature of the body is 98.6° F. You ask, How is it, then, that one can live in cold climates, where the temperature is as low as 80° F. below zero? or that others can live in hot climates, where the mercury climbs up to nearly 150°? We also have records of men who were able to endure the heat of ovens in which the temperature was sufficiently high to roast beef, or as high as 450°.

The ability of the body to regulate its own temperature with such precision and nicety is marvelous. Were we to attempt to regulate the temperature of our bodies, we should be kept busy the entire twenty-four hours of each day, putting on garments, laying them aside, adding a little more, building fires, opening windows, shutting doors; and no two persons would be suited with just the same conditions. Imagine all the confusion that would be entailed by our efforts. Indeed, having done our best, how poorly we should have accomplished the desired result! We should be uncomfortable all the time, if this had been left to us. But nature performs all her work perfectly and with ease, when allowed to do her allotted task.

Heat in the body is produced in two ways; first, by the oxidation, or burning up, of food, such as fats and starch; and, second, by the action of the different parts of the body. Every time the heart beats, or a muscle moves, heat is generated. As the blood is set in motion, the friction produced by its contact with the walls of the blood-vessels produces heat. A certain amount of electrical energy in the body is transformed into heat. At times too much heat is produced within the body, and so there must be some means of liberating it. Nearly ninety per cent of the heat loss of the body takes

place through the skin, and the lungs give off most of the remainder.

When an excessive amount of heat is produced within the body by the burning of food, by physical exertion, by emotion, or if we become too warm from heavy wraps or overheated rooms, this intelligence is telegraphed to a certain part of the brain; then word is sent to the little blood-vessels in the deep layers of the skin to dilate, and allow more blood to come to the surface. In this way the heat is given off, and the body is cooled. When the blood comes to the surface of the body, we begin to perspire; and as the perspiration evaporates, much heat is lost. It is in this way that we are enabled to keep cool during the hot summer days; and this is the reason why a man can remain in a hot oven.

Cold increases heat production, but contracts the blood-vessels of the skin; hence we can endure extreme cold with comfort.

In fever we have an overproduction of heat, but a non-sweating skin. The sweat-glands are inactive, because of the influence of the nervous system, and thus a high heat production takes place within the body, in order to burn up the poisons that are being formed.

The skin is an organ of sensation, and is the seat of many senses, rather than of one. By means of the skin we receive impressions of heat and cold. This is distinct from the feeling produced by contact with a solid body. The sensation of heat is transmitted by one set of nerves, and that of cold by another. The degree of sensation varies in different individuals; for this reason, heat and cold are relative terms so far as they concern us. What is hot to one person may be merely warm to another. The sense capacities of the skin are, after all, a matter of education. They are also influenced by disease. Tickling is a peculiar sensation, and is often independent of other sensations residing in the skin. Pain is another characteristic sensation of the skin. It is sometimes the

result of strange causes. For instance, a patient came into the office one day who would faint away if the finger were drawn across his skin, and this action was accompanied by excruciating pain.

The skin, being endowed with all these sensations, is therefore the medium by which we come into physical contact with the external world. We might better lose all the other organs of sensation than those of the skin; for the loss of other senses can be supplied, in part, by the functions of this structure. By educating the sense of touch, the blind are able to read raised type, to become sculptors, botanists, and experts in other callings.

Seeing, hearing, and smelling are touching at a distance. Waves of light touch the retina of the eye, and stimulate the sense of sight. Waves of sound touch the drum membrane of the ear, and produce sound. Minute atoms of volatile matter, permeating the air, touch the membrane of the upper nasal cavity, and cause smell. According to the teachings of science, no two bodies are ever in absolute contact; hence in any case we touch at a distance; and, according to this theory, in seeing, hearing, and smelling, we feel a force, not a substance.



Fig. 35
Touch corpuscle

The sense of touch varies in different portions of the body, being keenest at the finger-tips, the lips, and the tip of the tongue. This sense resides in the little papillæ of the skin, which we described in a previous chapter. If you examine the palm of the hand, you will notice numerous little parallel ridges. These ridges are formed by papillæ placed in rows. There are from twelve thousand to thirty thousand of these papillæ to the square inch. Two points but one twenty-

fourth of an inch apart may be clearly distinguished if applied to the tip of the tongue, while on the back and on the middle of the arm, a clear sensation of two distinct points of contact is not felt until they are separated by about two inches.

The sense of touch is easily influenced by heat or cold. All are familiar with the numbness of the hands caused by exposure to the cold. Great heat has the same effect. Frozen mercury and a red-hot iron feel exactly alike.

The Creator provided the skin with all these keen sensations, in order that we might know our surroundings, and avoid extremes and danger.

Another very important function of the skin is that of separating poisons and waste materials from the blood, and depositing them upon the surface, where they are absorbed, brushed off by the clothing, and partly washed off by the bath. If this duty of the skin is interfered with, serious results may follow.

In the world, the dead and the living are continually being separated. The dead must be disposed of in order to insure the safety of the living. If this were not so, the entire world would soon be depopulated.

Every living creature has within itself the means of destroying its own life; the seeds of death are always present. The dissolution that is continually taking place within the body is the result of sin. "The wages of sin is death." So, as the result of physical sin, the process of dying is constantly going on in the body; and the dead tissues must be separated from the living, or in a few hours all physical life would be destroyed.

God so formed the body that it is able to meet every condition, and keep us in life and health for a promised period, if we treat it properly. The liver is constantly at work destroying poisons that are circulating in the blood; and the kidneys, lungs, and skin are kept constantly active separating

these poisons and waste materials from the body. Thus it is easy to see that no part of this intricate machine ought to be hindered in its action. There are about two and one-half million little sweat-glands situated in the loose tissues under the skin; and these are connected with the surface of the body by the means of a tiny channel, or pore, all coiled up, looking like a corkscrew, and about one-fourth of an inch long (*12* and *13*). If all these little channels were placed end to end, they would make a canal nearly twenty miles in length. These numberless little ducts form the sewers of the body.

Each sweat-gland is made up of a large number of cells; and these, in turn, are surrounded by, and richly supplied with, blood-vessels.

These cells are actively engaged in taking water and impurities from the blood, carrying them up through the spiral tube, and depositing them on the surface of the body. The sweat-glands are always at work, although we are not always conscious of perspiring; for evaporation takes place as fast as the excretions are formed. In active exercise, or in hot weather, the sweat becomes sensible to us; for the evaporation is not in proportion with the excretion.

In addition to the sweat-glands, the skin contains another class of glands, called sebaceous glands, which are situated in the deep layer of the skin (*11*). These glands furnish a fatty, or oily, secretion, which anoints the skin and hairs, keeps them soft, and prevents too great loss of heat.

By means of these two sets of glands, several pounds of waste matter are separated from the body every twenty-four hours; and after the fluids are evaporated, a solid residue remains on the skin. If one neglects to take a bath for a few days, these waste substances accumulate and undergo chemical changes, or, in other words, putrefy, thus giving rise to very offensive odors. This shows the necessity of frequent bathing. Impurities without soon cause impurities within.

HYGIENE OF THE SKIN

41. Two important precautions should be observed in the care of the skin; it should be kept clean and free from all impurities; and nature should be assisted by adequate clothing, in regulating the temperature of the body.

A man-made machine will become worthless sooner from rust and disuse than from constant wear; so this wonderful machine, the human body, needs to be cared for, and every part should be more faithfully looked after than the most complicated engine.

As we have learned in our study of the skin, several pounds of waste materials are separated from the blood, and deposited upon the surface of the skin, every day. The upper layer of the skin soon loses its usefulness, and so dries and forms bran-like scales, which can be seen on any part of the body. Some of these are brushed off by the clothing, and some remain. The millions of pores and sebaceous glands are continually pouring their waste products out upon the surface of the skin. This makes bathing a necessity; and its performance is always mingled with no small degree of pleasure.

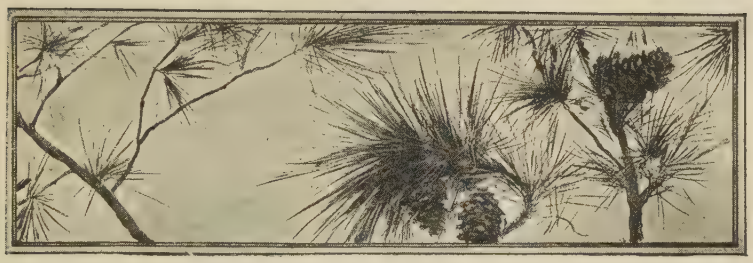
To bathe is a natural instinct, enjoyed and indulged in by many of the lower animals. Why should not man, who stands at the head of the earthly creation, value the bath, and employ it more frequently than do dumb animals? Yet some bathe but once or twice a year, and some never take a bath during the winter. There are those who take a bath only by accident,— by falling into a pond, or something of the sort.

The bath seems to be greatly enjoyed by both animals and plants. The gentle shower of spring is nature's method of administering a bath to all living things. A most beautiful sight is to watch a robin splashing in the water. As we pass along the road on a hot summer day, we notice that the growing corn looks pale and wilted; its blades droop in a lifeless manner, covered with dust. The flowers hang their heads. What a change is produced by a passing shower! The

flowers raise their heads in thankfulness. The corn straightens up, looks bright, and has a beautiful green color.

The bath is still more refreshing to man. It exhilarates; and if one is seeking the fountain of the elixir of life, I am sure the bath is the nearest approach to it. "Cleanliness is next to godliness." If the skin is not kept clean, and if the clothes are not frequently changed and cleansed from their impurities, the pores of the skin become less active; then these poisonous materials are absorbed, taken into the blood, and extra burdens are thus imposed upon some of the internal organs. Bathing frees the skin from all accumulated impurities, and keeps it soft and supple. For cleansing purposes the warm bath is the best. The temperature should be 90° to 98°. The hot bath, 98° to 105°, is of great service when one is weary from hard labor. It is also good to break up a cold. The cleansing bath should be taken at least once a week.

The cool sponge bath quickens the activities of the skin, hardens it, and is a most excellent means of guarding against colds. It is a delightful tonic, one that stimulates the skin, quickens the respiration, strengthens the heart, improves the digestion, rests the nerves, brightens the eye, cheers the soul, and vitalizes the mental faculties. Feelings of depression and uneasiness, loss of appetite, inability to sleep, lack of ambition, and morbid feelings are in many cases due to an inactive condition of the skin, and would vanish if the cold bath were made a part of the daily program. A morbid mind and melancholia are often associated with an inactive skin. Anything that affects the skin affects the mind. The skin is the keyboard upon which much of the harmony or discord of life is produced. A jaundiced skin indicates jaundiced nerves, brain, and muscles. Cosmetics should never be resorted to in order to obtain a beautiful complexion. They are injurious, and some of them are dangerous. A good complexion results from obedience to nature's laws. It must come from within the body, and not from without.



CHAPTER VI

Taste and Smell

42. These two special senses are very closely associated. We often confuse flavor and smell; and if a cold or any other condition interferes with smell, we find that the taste is less acute. Food has very little relish when one is suffering from a severe cold. By a study of the brain, we learn that the centers of smell and taste are together.

43. The tongue is not only used in speech and in the mastication of food, but on its surface are distributed the nerves of taste. It is coated with a mucous membrane, and is marked by many little red projections on its surface, which are called papillæ, or hillocks. Eight or ten large ones on the base of the tongue, arranged in a V form, are the circumvallate. Many smaller papillæ, called fungiform, are scattered over the surface of the tongue, especially the sides. The smallest and most numerous are the filiform, or hair-like papillæ, which are scattered all over its surface.

Each papilla is distinct, and is very red, because of its rich blood supply.

Running around each papilla, or on its outer surface, is a cluster of little cells arranged something like the leaves of an onion. These are called taste-buds. The tongue of the ox has about thirty thousand taste-buds. (Figs. 45, 46.)

Each taste-bud contains two kinds of cells, gustatory, or taste cells, and supporting cells. On the outer end of a taste cell is a little hair-like projection. When any substance that has taste touches these little projections, we have a sensation of sweet, sour, bitter, or salt.

The nerves of taste are the glossopharyngeal and the gustatory nerves, and some think that the corda tympani nerves are concerned with taste.

Bitter substances are best tasted on the back of the tongue; sour fluids, on the sides of the tongue; and sweets and salt, on the tip. We can not taste so well with the middle of the tongue. Metals have a distinct taste.

Many foods have flavors which we think we taste, but they are only appreciated by the sense of smell. To demonstrate this hold the nose while eating an onion or a potato.

The taste-buds are placed as sentinels at the beginning of the pathway of food. The like and dislike for food depends upon the reception it receives from the taste-buds. However, there are substances with a sweet or pleasant flavor that are poisons.

The sense of taste, when normal, will regulate the appetite, and will indicate the character of the food required by the system.

The placing of the taste-buds in the mouth indicates that food should linger there for some time. Chewing increases the quality of taste. Food should remain in the mouth so long as it has any taste, and it might be well for many to remember that there are no taste-buds anywhere else in the alimentary canal.

When the taste-buds cease to give one pleasure in eating, it is usually time to stop. If they are stimulated by condiments of any kind, they cease to be a guide, and overeating and gluttony are the result.

The delicacy of taste is hindered by very hot or very cold fluids or foods.

SMELL.

44. The sense of smell stands guard over the respiratory passage, just as taste is a sentinel at the beginning of the food and drink passage.

The nasal chambers are divided into three portions. Through the lower portion, or the inferior meatus, passes the air that goes to the lungs. In the upper portion is located the sense of smell.

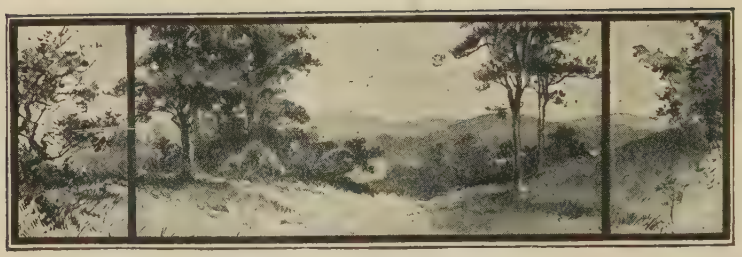
The nasal chambers are lined by a very vascular mucous membrane. In this membrane are special cells with little hair-like projections, called olfactory cells. Air that enters the lungs must first undergo an examination by these cells as to its fitness to enter the body. The senses of taste and smell, aided by judgment and reason, protect the body from many harmful substances.

45. From the smell cells, the sensation of smell travels over the many little branches of the olfactory nerves, which pass through a sieve-like plate of bone, to the olfactory bulb, over the olfactory tract, to the uncinate convolution of brain, where it is registered as smell.

Smell is touching at a distance. It is the brain that smells, not the nose. Substances that excite the sense of smell exist in the air in a volatile form. It is said that a grain of musk will for years communicate its odor to the air of a room without diminishing appreciably in weight.

The olfactory cells are soon depressed by strong odors, and need rest before they can again transmit stimuli to the brain. The dog has a much more acute sense of smell than man.

"Just as taste and flavor influence nutrition by affecting the digestive process, and as the sight of agreeable or beautiful objects, and the hearing of melodious and harmonious sounds, react upon the body and help physiological well-being, so the odors of the country, or even those of perfumes, play a beneficent role in the economy of life."



CHAPTER VII

The Eye and the Sense of Sight

46. *Structure of the Eye.*— Above the eye are the eyebrows, which not only add to the appearance of the face, but keep sweat and dust out of the eye.

47. The eyelids are the curtains of the eyeball, and protect it. The eyelids are two folds of skin, the outer layer being very thin and sensitive. The inner fold is the wet skin, or mucous membrane, called conjunctiva. The conjunctiva of the eyelid passes over on the front of the eyeball to the edge of the cornea. In the eyelid is a cartilage, which gives it form, and a circular muscle, which closes the eyelid; it works automatically, and yet is under the control of the will.

In the edge of the eyelid are the eyelashes, which adorn the eye, shade it from intense light, and keep out dust and foreign bodies. Little glands in the edge of the lid secrete an oil that lubricates the front of the eye.

48. The tear-gland, or lachrymal gland, is a little living fountain tucked away in the upper and outer part of the eye socket, which pours its secretions through a dozen little pipes on the front of the eyeball from the upper eyelid. The tears, after washing the front of the eye, are carried by the edge of the eyelids to the inner corner of the eye, where they

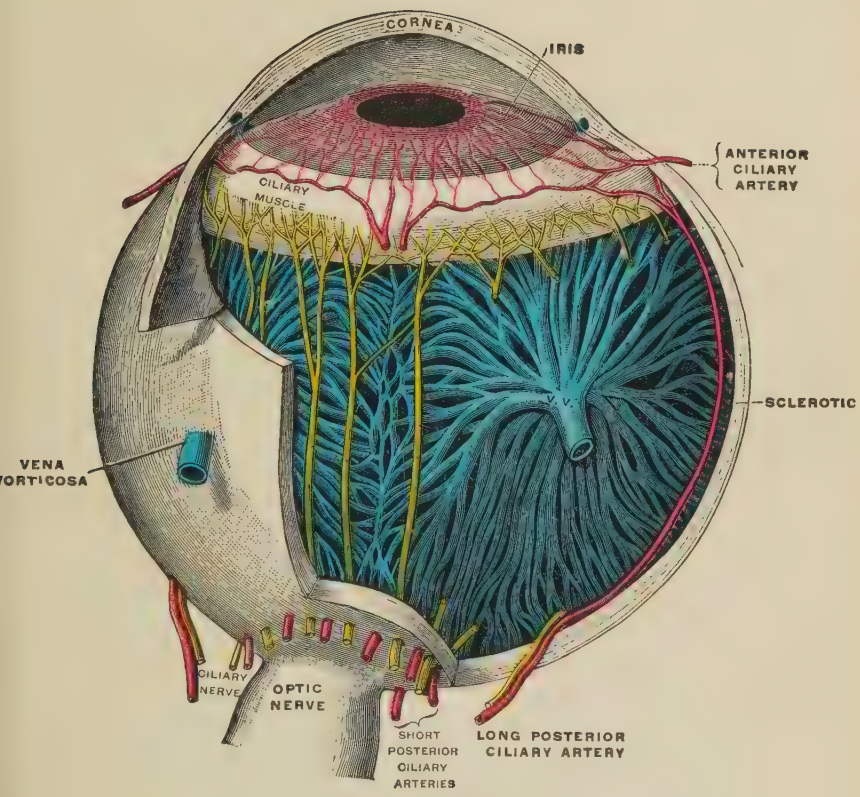


PLATE II. The Eyeball

Diagrammatic view of the eyeball. Vessels and nerves of the choroid and ires seen from above. The sclerotic and cornea have been largely removed

pass through two lachrymal canals into the lachrymal sac, through the nasal duct into the nose.

49. The eyeball is nearly spherical, and is about one inch in diameter. Behind it are six little muscles which move it in all directions. The eye has three coats. The outer one is white, thick, and firm, giving shape and form to the eyeball. It is called the sclera. The front one-sixth of the eyeball is transparent, and is called the cornea. It is the window-pane of the eye. The cornea has four layers. The optic or sight nerve enters the back part of the sclera. All around are little openings for the passage of blood-vessels and nerves. (See plate.)

50. The second coat is the choroid, or vascular coat. It is dark purple in color, and shades the chamber of the eye.

51. The iris (rainbow) is a ring of muscle covered by pigment or color cells, seen just behind the cornea. In the center of this is a round hole, called the pupil of the eye. The pigment, which varies in each individual, gives the color to the eye. When the little muscle fibers in the iris contract or relax, the pupil becomes smaller or larger according to the light required. The pupil of the eye is dilated by sympathetic nerves; it is contracted by the third pair of cranial nerves.

52. The third coat of the eye is the retina. It is the expanded end of the optic nerve. This is the coat that transmits pictures to the brain, and it is much more sensitive than the most delicate photographic plate. It is very thin, and yet made up of ten layers. The ninth layer is composed of rods and cones, about three million cones, and nearly ten million rods. It is probably in this layer that vision originates.

The optic nerve enters a little to the inner side of the axis of the eyeball. This forms the blind spot. In the retina corresponding to the axis of the eyeball is the yellow spot, in the center of which is the area of most distinct vision. (See plate.)

Behind the iris is a double convex body one-third of an inch

in diameter, perfectly transparent, called the crystalline lens. In front of it is a room filled with water, aqueous humor, and behind is a very much larger room filled with a transparent jelly-like substance, called the vitreous humor. So from the cornea to the retina light travels through transparent media.

53. Accommodation is the ability of the eye to adjust itself to near or distant vision. This is accomplished by a little muscle, called the ciliary muscle, which alters the shape of the crystalline lens. When we look at distant objects, the front of the lens is nearly flat; when looking at near objects, it is convex.

54. We see with the brain. The eye is only the apparatus for transmitting sensations of light. Light passing from a body enters the eye, and forms an inverted image upon the retina. The sensitive waves of light striking the retina excite it in some manner, and these stimuli are carried over the optic nerve, over the optic tract, to centers of gray matter in the brain, and from there to the surface of the back part of the brain, where the visual centers are located. Then the sensation is stored in cells as memory.

Images falling upon the outer half of the retina pass to the same side of the brain. Those falling upon the inner half, or the nasal side, pass to opposite sides of the brain. This is why we do not see double. Both sides of the brain are acting at the same time, even if we close one eye.

We see better with two eyes, for the retinal images of the object overlap, so to speak. One eye sees more of one side of the object, and the other eye sees more of the other side.

In the normal eye rays of light come to a focus upon the retina. The rays focus in front of the retina in short-sighted eyes. In far-sighted eyes the focus of light is behind the retina. In such it is difficult to adjust the eye to see near objects. The point where light is focused depends upon the shape of the cornea, the crystalline lens, and upon the length of the eyeball.

When the different diameters of the cornea vary in convexity, letters are blurred, stars and lights look different, and we say that such a person has astigmatism.

When the muscles that control the movements of the eyeball are not in equilibrium, and certain muscles are short, weak, or overdeveloped, the eye or eyes are converged or diverged, and we say the person squints, or has strabismus, that is, he is cross-eyed.

THE HYGIENE OF THE EYE

55. The eye is a most delicately constructed miniature camera. It is a vitalized, automatic camera, self-focusing, self-loading, self-printing, and adjusted by the most complicated mechanism. The retina is the dry plate upon which are focused the varying images of daily life by the cornea and the crystalline lens. The iris and the ciliary bodies form the diaphragm; the eyelids act as a drop-shutter; the large chamber back of the lens is the camera proper; and the choroid coat forms the draping which makes this chamber the dark room.

56. *In Infancy.*— The eye of the new-born is hypermetropic, or far-sighted, which probably accounts for the fact that the young child reaches out for distant objects as if they were near. For the first few days of life the infant can see nothing definitely, and the eye is very sensitive to light. All know the dazzling effect of light after they have been in the dark for some time. To the new-born, light is painful, for the eye is not accustomed to it. This fact emphasizes the necessity of protecting the eyes of an infant from the direct rays of a bright light. At this period the eye may be permanently injured by carelessness. As soon as a child is born, the eyes should be washed with a piece of lint dipped in a solution of boracic acid. The hands should also be washed at once, to avoid infecting the eye. Neglect of this has cost many an infant the loss of an eye.

57. *In Childhood.*— During this period, and while in school, the eyes need to be carefully guarded from overwork and abuse. More than thirty per cent of school children have defective eyes, due to bad positions, improper light, overstudy, bad food, and malnutrition. In studying, the feet should be on the floor or on a stool, the body straight, and the head erect. Stooping over work interferes with the return circulation through the jugular veins, thus confining the blood in the eyes, orbits, and brain, producing congestion of these parts.

The light should fall over the shoulder, upon the work or the page, and never come from in front of the reader. The type should be large, broad faced, the ink black, and the paper or book held at a proper distance from the eye.

58. Myopia, or near-sight, is developed during youth and young adult life, and is very much increased by continuance at close work. This may often be avoided by temperance in the use of the eye, and by not straining the vision. A child should never do a full amount of school work soon after having had measles, scarlet fever, diphtheria, or any other exhausting acute disease. Good food, fresh air, outdoor exercise, and an active skin, are all conducive to good vision. A child that has defective eyesight should have it corrected at once.

59. *In Adult Life and Old Age.*— During this period there is a gradual weakening of the accommodative powers of the eye, and so presbyopia, or vision of old age, is developed. If one has been far-sighted, this failure of accommodation can be corrected only by glasses, while the myope may see better, at least for a time.

60. *Injuries to the Eye.*—A cinder, a grain of sand, dirt, or any foreign body in the eye, causes intense pain. Under such circumstances the eye should not be rubbed; but if it is rubbed, the movement should be toward the inner corner. A foreign particle may often be removed by keeping the eye closed for a few minutes, and then pulling the lid away from

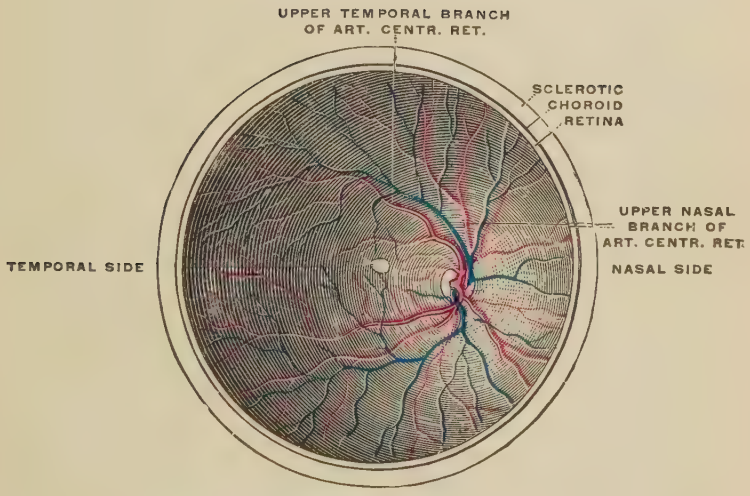


PLATE III. Retina of the Right Eye

Front view, showing entrance of the optic nerve

the eyeball. The abundance of the secretion will wash the irritating particle away. Throwing the head back and washing the eye with boracic acid is another efficient means. If this does not give relief, have the patient sit in a chair with his head back on some support, and the eye looking downward. Let the assistant stand behind the patient, and with the right hand pull down on the upper lid and away from the eyeball, at the same time pressing on the lid with a pencil, a toothpick, or the end of the finger. In this way the lid can be folded back upon itself, and the particle on the lid or eyeball exposed. It can now easily be removed with the corner of a handkerchief. The lower lid can be exposed by simply pulling down on the skin below it.

Lime, mortar, acids, or hot fluids in the eye should be attended to at once. Wash the eye with warm water, and drop in a few drops of olive-oil as a soothing application. Lime can be neutralized by washing the eye with water and vinegar, one teaspoonful of vinegar to two tablespoonfuls of water. Acids can be neutralized by washing with soda and water, one teaspoonful of soda to half a glass of water. After any such injury the eye should not be used, and should be treated with cold compresses or hot applications, cold being best at first.

At times a fragment of iron, steel, or brass may become lodged in the cornea, and can only be removed with a spud. This condition may be so painful as to require putting a few drops of a weak solution of cocain into the eye. A bruise due to a blow or a flying stick should first be treated with cold compresses and later with hot applications.

61. *Diseases of the Eye.*— Many of these are of such a nature as to require the attention of a specialist. Simple inflammation of the conjunctiva, or a "bloodshot" eye, may be treated as follows: Wash the eye with a boracic acid solution, fifteen grains to the ounce, every two hours. Apply cold compresses or a rubber bag filled with ice-water from

fifteen to thirty minutes at a time, and repeat every two hours.

Often on awaking in the morning there is a secretion on the edge of the lid. This should not be rubbed off, but, instead, the lids should be bathed with warm water, and this repeated at bedtime.

Defective conditions of the refractive and the accommodative function of the eye are a frequent cause of headache, often of the most aggravated type. Very frequently headache above the eyes, in the temple, or at the back of the head, may be the only symptom of an ocular defect. These defects of the eye are often due to sickness or imperfect nutrition. Long continuance of visual troubles may cause insomnia, nausea, dizziness, and even general failure of health.

When the sight becomes hazy, the letters blurring and running together, or when the letters become irregular, and the eyes tire easily, the lids becoming heavy, and one grows sleepy as soon as he begins to read; when the eyes burn, smart, and itch, accompanied by watering of the eye and a feeling as if sand were under the lid, an oculist should be consulted at once, and the eyes thoroughly examined. It is always economy to have the eyes very carefully tested. Do not buy glasses or spectacles of peddlers.

The foregoing symptoms, however, may be relieved very much by resting the eyes at intervals, by bathing them frequently with very hot water, by dashing cold water in the eye, by applying cold compresses for a few minutes, and by taking more sleep.

When the white of the eye becomes yellow and dingy, and the eye has lost its luster and brilliancy, there is a physiological condition of actual "dirt in the eye." This indicates that not only the eye, but the entire body, is yellow and dingy within, and needs thorough cleansing. This may be accomplished by carefulness in diet, exercise, copious water drinking, and such baths as will increase the activity of the skin.

62. *Effects of Tobacco and Alcohol on the Eye.*—Those desiring to retain good eyesight should avoid these poisons. Tobacco has a decided effect upon the sight, and weakness of the eye is often due to its use. Tobacco may produce color-blindness, marked congestion, and total blindness, which in time leads to disease of the optic nerve, producing blindness beyond recovery. Alcoholic poisoning has a profound effect upon the eye, and the vision is impaired.

63. *Things to Avoid.*— 1. Avoid reading in a dark room, in the dusk of evening, or by a poor light.

2. Avoid reading with the light in front of you, but rather have the light fall over the shoulder. A lamp should be shaded.

3. Avoid dazzling lights and sudden changes in extremes in light, and never use the eyes when light is painful to the sight.

4. Avoid reading during sickness, and after measles, scarlet fever, or any exhausting disease.

5. Avoid reading when lying down. This is an unnatural position, straining the eye and producing congestion.

6. Avoid reading, at least for any length of time, on a moving train or when riding in a carriage, for the constant jar changes the focus of the eye, necessitating constant action of the ciliary muscles in accommodation.

7. Avoid prolonging the use of the eyes for near or fine work; rest the eye frequently by looking at objects at a distance.

8. Avoid reading in a stooped position, for this interferes with the return circulation, and congests the eye and the brain.

9. Avoid rubbing the eyes with the hand or with a rough cloth, but rather bathe them in cold water twice a day.

10. Do not persist in using the eyes when everything appears hazy and the letters blur, but obtain suitable glasses.



CHAPTER VIII

The Ear and the Sense of Hearing

64. The bodily members that are most delicate in construction and easily influenced by external causes have been especially protected by a wise Creator. Thus we see what a wonderful provision nature has made for the protection of the eye from injury. It is surrounded on all sides by bony projections. The organ of hearing is in many respects more sensitive than the eye, and hence the most wonderful part of this special sense organ is surrounded on all sides by a firm wall of bone, and so placed that it is not easily reached by any blow.

How far down in the animal creation the sense of hearing extends we are not able to say, but it is known that some insects hear. In the lobster the ear is of the simplest construction, consisting of a small bag at the upper part of the second pair of feelers, filled with a watery fluid and covered by a strong membrane. On the inside a nerve is spread out all over this membrane, and this carries the motions of the fluid as impressions. In the cod this little bag contains little ear-stones, and these make the vibrations of the fluid more powerful. In the grasshopper and the cricket the ears are placed in the front pair of legs.

In the higher animals and in man the ear is a most marvel-

ously constructed organ, and exceedingly delicate. It is considered the most complicated organ of the special senses.

Anatomically the ear is divided into three parts,— the external ear, the middle ear, and the internal ear.

65. *The External Ear.*— This, in turn, is made of two parts,— the auricle, or the part commonly designated as the ear; and the auditory canal, the channel through which the sound travels, at the inner end of which is the drumhead, or the partition that separates the external ear from the middle ear. The outer ear in man no doubt serves more to help give symmetry and expression to the face than to collect sounds; but in many of the animals the outer ear serves as a hearing trumpet, as in the horse, the cow, the dog, and many other animals that have a very acute sense of hearing; and in these animals the ear can be turned in different directions. In man the body of the ear stands out from the head and projects forward, thus harmonizing with the general contour of the face and skull. Any departure from these outlines is quickly noticed. It has been said that in the famous statue of the Faun, by Praxiteles, the pointed ears give to the whole a weird and inhuman expression.

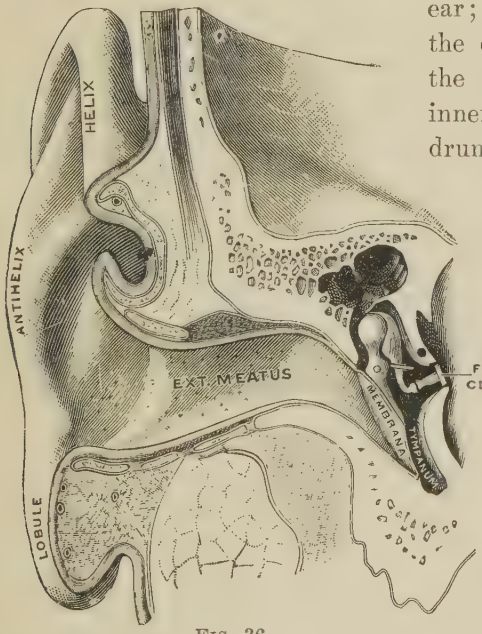


Fig. 36
A diagrammatic view of the ear

66. *The Middle Ear.*— As the name implies, this is located between the external and the internal ear. It is an irregular-shaped chamber, hollowed out of the bone, and contains the three smallest bones of the body. Leading from this chamber to the throat is a little tube about an inch and a half long, called the Eustachian tube. Every time we

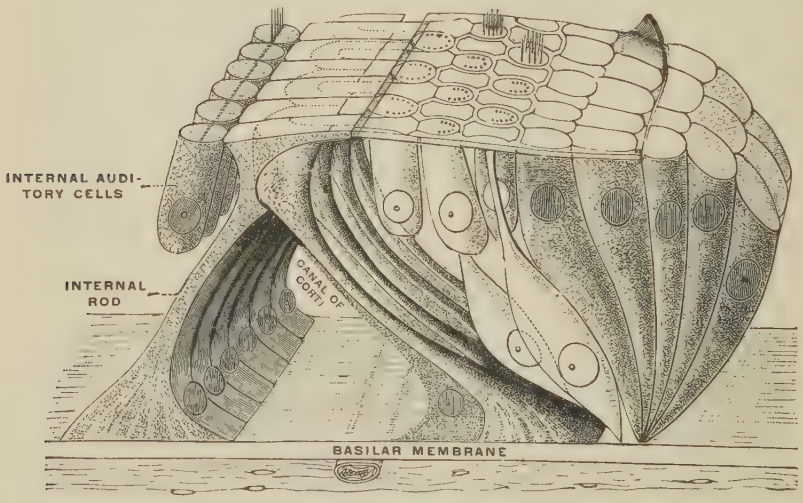


FIG. 37
Organ of corti, in the internal ear

swallow, this tube is slightly opened, and the air enters it, thus equalizing the air pressure on both sides of the ear-drum. The air within the tube is quickly absorbed, and the increased pressure from without presses the drumhead in, locking the little bones, and preventing their moving freely. If the little tube leading into the throat is permanently closed, and air prevented from entering, deafness results. This is one of the most common causes of deafness.

Catarrh of the throat causes ninety-five per cent of all cases of deafness. The mucous membrane about the end of the Eustachian tube, as well as the lining of the tube itself, becomes thickened, and this closes it, preventing the entrance

of air. Normally, this tube is not always open, but only while swallowing, which is due to the action of a little muscle that is attached to it as it enters the throat. This can be distinctly felt by closing the nose and swallowing. The sensation felt in the ears is due to the withdrawal of air from the tube in the first act of swallowing, and continues until the air is restored.

In a severe cold, when the nose is blown, there is a sensation of fulness in the ears, which is relieved only by swallowing, it sometimes being necessary to swallow several times before the air is drawn out. There is a good reason why this little tube is not always open. If it were, all sounds of the voice would pass directly to the drum of the ear. We should hear each respiration as the air rushed in and out through the throat, producing a constant bewilderment of sounds in the internal ear. Thus the one important purpose of the Eustachian tube is to allow a free interchange of air between the middle ear and the throat.

67. *The Internal Ear.*—This is the most wonderful division of the organ of hearing. This most complicated portion is called the labyrinth. It is made up of a series of communicating canals and spiral tubes, the latter forming what is called the cochlea, a shell-like structure making just two turns and a half, culminating in a small point. Starting from this point, the canals become larger and larger, thus making room for an increased series of vibrating cords or fibers, which gradually increase in size, as do the wires of a piano. In the two turns and a half which

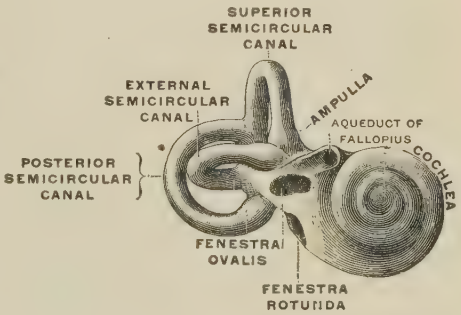


Fig. 38
Semicircular canals and shell

are made in this shell, there are thousands of these little fibers given off, each one responding to a certain tone, or pitch of sound, those in the point giving a high pitch, while those near the base have a low pitch.

In this way, nature has made an abundant provision for the hearing of an immense variety of notes and tones, and the various modulations heard all about us. There is no doubt that we should hear music made by the flowers, the roses, the lilies, the grass, and every living thing, if our hearing were only acute enough. By means of the semicircular canals we hear noises, such as the rumbling of a train, or the squeaking of a shoe, while with the fibers in the shell we are able to appreciate musical sounds, and to recognize the voices of our friends.

Every nerve-fiber in the shell is tuned to a certain pitch, thus enabling us to distinguish different tones. This accounts for the fact that some hear higher notes than others. Some hear certain sounds well enough, but they can not hear the shrill note of the cricket. Others, in ascending the scale, do not hear certain notes. Again, a person may fail to hear an entire octave in the very high-pitched notes, and then recognize notes above this again. Some persons hear an ordinary conversation, but not the whistle of a locomotive; while others can hear the tick of a watch, but can scarcely hear musical tones of the voice.

In man the ear is more highly organized than in any other animal; and man, more than any other creature, is able to appreciate distinctions in sound.

It is said that Thebes had many gateways, through which passed great caravans, laden with costly treasures and fragrant merchandise. We might say that the five special senses are the great highways through which pass all the Creator's communications to man. The ear is the highway over which a caravan of sound travels to the brain. It is the avenue over which may pass noble truths, cheerful words, messages of

affection, inspiring and subduing strains of music. All these are wave-motions, vibrations of air, touching at a distance, and yet when passing over the auditory nerve, they are changed into a part of our being.

"That is the one great mystery of all the senses. We can not penetrate it yet; but we feel — all ought to feel — how wonderful it makes the world. That which seems mere motion in the ear and in the nerve, turns into joy or sorrow in the soul. If it is all this to us, what must it be to God, who made it?"

HYGIENE OF THE EARS

68. Most of the organs of the body are so placed that man is not given immediate control over them, nor is it necessary for him to care for each one individually. There are, however, general laws to which we must conform,— laws established by the Creator,— and if we co-operate with God, and refuse to work contrary to those laws, he will keep all parts of this wonderful machine in healthful action.

It is for us to see that the external ear is kept in a healthy condition, but nature has provided her own cleaning apparatus for the ear passages. At the entrance of the auditory canal are numerous hairs, which serve to keep out dirt and insects. The lining membrane of the canal contains small glands, which secrete a thick, yellowish, oily wax, that is very bitter. Because of this bitter taste, no insect will, of itself, invade this canal. What becomes of the wax? — It dries up in the form of small, whitish scales, which peel off from the surface, and, aided by the action of the jaw, drift out of the ear. These are nature's ways of keeping this passage clean.

In health the canal is never dirty, and becomes so only by too frequent attempts to keep it clean. It is for this reason that some people who love cleanliness, and others who are more or less fastidious in their habits, suffer most from ear troubles. Many well-meaning mothers do more harm than

good by trying to clean the wax out of their children's ears by artificial means. The child invariably cries or makes some demonstration of pain when this is attempted. Twisting up the corner of a towel or handkerchief and turning it round in the ear is one of the worst methods of getting out the wax, and it does a great deal of harm. Not only is the wax not removed by this method, but the canal is irritated by the friction, and often becomes inflamed.

It is a dangerous practise to introduce ear spoons, ear sponges, pins, hairpins, toothpicks, etc., into the ear, to remove the wax. There is as much wisdom as humor in the old adage, " Put nothing into your ear smaller than your elbow."

If an insect gets into the auditory canal, drop in a little sweet-oil, which will either drown it or cause it to crawl out. The ear should never be probed to remove a foreign object. Do not be afraid that it will get into the brain, or even into the middle ear.

Washing the ear canal with soap and water is also injurious, as it moistens the wax, thus increasing its quantity, and forming a better surface for the collection of dust and dirt. Washing should extend no farther than the finger can reach.

No cold water nor any other cold liquid should be put into the ear. Bathing and swimming with the ears submerged, is no doubt one of the causes of ear trouble. It is well known that dogs, when thrown into the water, or those that are in the water a great deal, become deaf. Cotton should be placed in the ear if one is going to dive while in swimming. If out in a cold, piercing wind, or in a driving snow-storm, the ears should be protected. It is best, if possible, to face the wind. If cotton is placed in the ears at such a time, it should be removed as soon as possible.

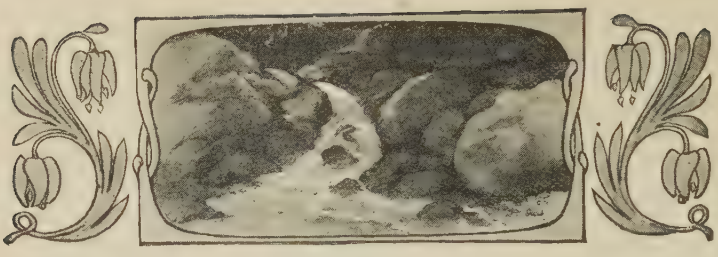
When there is an unhealthy condition of the auditory canal, as a result of measles or scarlet fever, the accumulation of wax can be easily removed by dropping a very little warm sweet-oil into the ear, letting it remain until the wax is sof-

tened, and douching out the ear with, preferably, a fountain syringe, using from half a pint to a quart of water at a temperature of about 105° or not warmer than 110° F.

When a cold is contracted, cotton is sometimes inserted in the ear as a protection to the throat. The cold is recovered from, but the cotton is often forgotten, and sometimes remains for years before it is discovered by the aurist. Cotton soaked with laudanum or chloroform should never be put into the ear; for these drugs have a strong affinity for water, and act somewhat as a caustic, producing irritation.

Avoid violent blowing of the nose in an acute cold; for this may cause the inflammation to extend into the Eustachian tube, impairing the hearing, and often resulting in deafness.

Never box the ears. Such a practise is both wicked and cruel; for it drives the air with such force against the drumhead that it is often ruptured, resulting in impaired hearing. Supposed inattention in children is often not a lack of attention, but a lack of hearing. When a person expects to be spoken to, he may hear distinctly; whereas, if unexpectedly addressed, he may seem very dull. This indicates that there is some fault in the hearing. Some people do not hear when not listening.



CHAPTER IX

The Stream of Life

69. "The blood is the life." "The life of all flesh [the tissues] is the blood." This is on the authority of Holy Writ, and it is substantiated by physiology.

The blood is a healing stream, sweeping through artery and vein, carrying life to every tiny cell of the body, making the entire being throb with life. The blood has only one mission, and that is to heal.

Every intelligent person to-day knows that the blood is the life of the body, and that it flows in a stream, or, as we say, it circulates. Physicians in the time of Christ did not know as much about the blood as an ordinary schoolboy does to-day. Very learned physicians in those days did not know that the blood circulates all through the body; and, what is more strange, they thought that air instead of blood is in the arteries, and that it is a spirit. This strange belief was taught until 1616, when Harvey, of London, made known his discoveries that the blood circulates, and that the arteries contain red blood and the veins a darker blood. Dr. Harvey was persecuted bitterly for his "strange doctrine." To-day all the world knows his name.

Every structure of the body contains blood, with the exception of the outer layer of the skin, the cornea of the eye,

the hair, the nails, and the cartilages. These parts are nourished by a fluid called lymph.

70. When examined under the microscope, the blood presents a very beautiful appearance. If a drop of freshly drawn blood is quickly placed under the microscope, many interesting things will be noticed. In a few seconds many little columns are formed, made up of red corpuscles piled up against one another. Red corpuscles, when highly magnified, are not red, but a pale straw color. It takes thirty-two hundred, edge to edge, to make an inch, and twelve thousand eight hundred to make a pile an inch high.

Red blood-corpuscles are biconcave, or disc shaped, on each side, with a thickened rim. Inside the cell is a coloring substance called hemoglobin. Hemoglobin unites with oxygen in the lungs, and this gives the blood its bright red appearance. Each red corpuscle, and there are one hundred eighty billion of them, is a little boat floating around in the body with a load of oxygen. There are five million red blood-cells in a cubic millimeter of blood, the millimeter being one twenty-fifth of an inch.

In addition to red blood-corpuscles in the blood, there are white corpuscles, or colorless cells. These are not nearly so numerous as the red, the proportion being one white to seven hundred fifty red. The number of white cells in the blood varies with one's age, the time of day, food, water, sickness, baths, and exercise. The white cells form the standing army of the body. They destroy germs, and carry food to any part that has been invaded by germs, in order to build it up. Thousands of white cells may be found around an area of inflammation.

71. About eighty per cent of the blood is fluid. In this water-like fluid, called blood plasma, are suspended the blood-cells. The blood is alkaline in character. The greater its alkalinity, the more marked is its healing power.

In a short time after blood is drawn, it coagulates, or clots.

This is due to a ferment in the blood, called fibrinogen.

In the human body, from one-tenth to one-thirteenth of the total weight is blood. One-fourth is found in the muscles, one-fourth in the liver, one fourth in the brain, heart, and lungs, and one-fourth in the other organs.

72. The red blood-corpuscles are formed in the red marrow of the long bones, especially in the ribs. The marrow of bones is very rich in blood-vessels. The spleen is also a place where red blood-cells are formed. The life of the red blood-corpuscles is from three to four weeks. In this time one may obtain all new blood. When one cell dies, another takes its place.

73. Between the capillary walls and the tissues is a thin watery fluid, called lymph. It fills up all the spaces between the cells of the body. Every brain cell, every liver cell, every cell in the body, is surrounded by a thin film of lymph, from which it takes its food and gives back waste products. It has been estimated that one-fourth the weight of the body is lymph. The total amount that passes into the blood each twenty-four hours is said to equal the weight of the blood.

THE HEART AND THE CIRCULATION

74. The heart is an engine and pump combined, pumping the blood with such force that it is carried to every part of the body. It is a very wonderful device. It works night and day without stopping, and yet succeeds in obtaining about fifteen hours' rest out of every twenty-four.

The heart is a hollow, pear-shaped muscle. It is about the size of the individual's fist, whether a baby or a powerful man. It weighs from ten to twelve ounces in the adult. It is surrounded by a closed sac, called the pericardium.

75. The small end of the heart, or apex, points to the left and downward. It is as low as the fifth intercostal space. The large end, or base, of the heart points upward and to the right, and is under the sternum, or breast-bone. In other

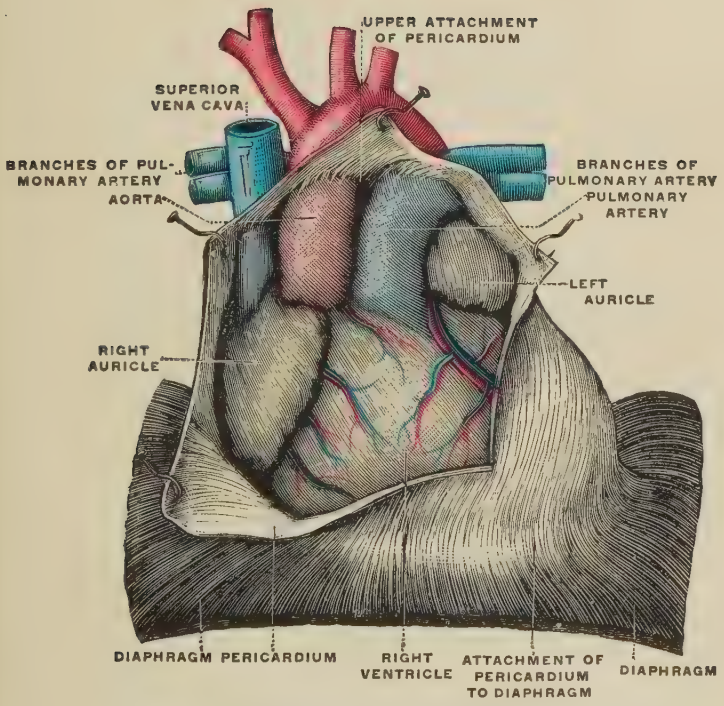


PLATE IV. The Heart

Pericardium cut open in front

words, the heart occupies an oblique position in the chest between the lungs.

The heart is really a double organ. So far as the relations of the two halves are concerned, they might be separated, and placed on each side of the body. Each half consists of two chambers, or rooms,— an upper room, called the auricle, which receives the blood from the body; and a lower room, called the ventricle, which, in turn, forces the blood into the body.

76. The right auricle is the upper front room of the heart. It receives all the venous blood from the body. Into it empties the superior vena cava, carrying the venous blood from the head, neck, and arms; and into its lower part empties all the blood from the trunk and lower part of the body. Between the right auricle and ventricle is a trap-door, called the tricuspid valve, through which flows the blood into the right ventricle.

77. The right ventricle, or lower front room, is a curious room, with strange walls, made up of many little pillars. This room holds about three ounces. A thick layer of spiral muscle fibers separates the two ventricles. When the blood is flowing into the ventricle from the auricle, the valves of the trap-door are loose and hanging down into the ventricle. As the ventricle fills up, the valves float on the rising flood until they are forced shut. The three parts of this valve all come together so closely that no blood can return into the auricle. In the ventricles are many little cords, called chorda tendinæ, which pass from the wall of the heart to the under surface of the little valves. These act as guy-ropes to the valves, and prevent the blood from forcing the valves into the auricle when the ventricle contracts.

Near the wall, or partition, or septum of the heart is another set of valves, three in number, and half-moon in shape; so they are called semilunar valves. The ventricle forces the blood through this opening into the pulmonary artery,

and this carries the blood to all parts of the lungs, where it is oxygenated. We may call the right heart the venous heart.

78. The left auricle is the upper room on the left side of the heart, and is behind the right auricle. A very thin wall separates the two auricles. The wall of both auricles is thin, but the left auricle has more muscle. The left auricle receives the first bright red arterial blood from the lungs through four tubes, called pulmonary veins. These are the only veins that carry arterial blood.

Between the left auricle and the left ventricle is another trap-door, called the mitral valve. The blood passes through this opening into the left ventricle.

79. The left ventricle holds about three ounces of blood; the inside resembles the right ventricle. The wall of the left ventricle is three times as thick as that of the right ventricle. The left ventricle has to force the arterial blood to every part of the body, against great resistance. For this reason it has strong muscular walls. The chorda tendinæ are thicker, but less numerous. The left ventricle forms the apex of the heart.

Near the ventricular septum, in the upper part of the left ventricle, is another set of semilunar valves, that marks the beginning of the largest artery, called the aorta.

THE BLOOD-VESSELS

80. The arteries are the channels for distributing the arterial blood all over the body, and the veins return the blood to the heart. The arteries are a continuation of the heart, and are subject to all its laws.

The arteries have three coats. The middle coat is the most important one, as it contains muscle and also elastic tissue. Through the control of the nervous system the vessels can be contracted or dilated according to the needs. Elastic tissue predominates in the larger vessels, while the

unstriped muscle fibers are more prominent in the medium-sized and smaller vessels.

The aorta is the largest artery in the body, and it gives off branches which supply every structure. As the arteries branch and rebranch, they become smaller and smaller, until they are hair-like tubes, called capillaries. All together there are nearly a thousand arteries carrying the blood away from the heart.

The first branches of the aorta are the coronary arteries, supplying the heart. The carotid arteries pass up in the neck, supplying the head, the face, and the brain. The brachial arteries go to the arms, the bronchials to the lungs, the gastric to the stomach, the hepatic to the liver, the splenic to the spleen, the renal to the kidneys, the greater and lesser mesenteric to the intestines, the ovarian to the ovaries, the uterine to the uterus, and a large branch goes down each leg to the feet, supplying each muscle and joint, also the skin.

The very small arteries are called arterioles, and these finally terminate in a network of vessels, called capillaries. They are so small that blood-corpuscles have to go through in single file. Their walls are very delicate and thin, being formed by a single thickness of cells. Between these cells are little spaces, through which pass the fluids that nourish the cells. All the changes in the blood take place in and around the capillaries. The capillaries are very numerous in the skin, in the mucous membrane, and in the lungs.

THE VEINS

81. The veins begin with the termination of the capillaries, and gradually become larger, until they form the large veins, the inferior and superior vena cava, which empty into the right auricle. Veins are larger than the corresponding artery, their capacity being two or three times that of the arteries; and they are much more numerous. The veins are arranged in a superficial set, and a deep set accompanying

the arteries, and they communicate much more freely than do the arteries.

The wall of the vein is thinner than that of the artery, and contains less muscular tissue. Veins that are subject to muscular pressure and are more than one-twelfth of an inch in diameter, have valves. These valves support the column of blood. They prevent the blood from flowing backward. In the large veins of the legs there are many valves. After death nearly all the blood is found in the veins, and the arteries are empty.

The nervous system has direct control of the heart and blood-vessels. The vagus nerve slows the action of the heart, while sympathetic fibers going to the heart increase its action. It is influenced reflexly through the sympathetic system. A violent blow in the pit of the stomach may cause death, by stopping the heart. A stomach distended with gas may cause the heart to beat very rapidly. The center that controls the heart's action is in the medulla oblongata.

82. The blood-vessels are under the control of nerves, called vasomotor nerves. The vasomotor centers are in the medulla oblongata and in the spinal cord. The vasoconstrictor nerves pass to the muscular coats of the arteries and veins, and, when stimulated, cause the muscle to contract, and so constrict the vessel, or diminish its diameter.

83. The vasodilators have an opposite action. By this means the flow of blood to the heart is quickly and easily controlled. They also have much to do with the regulation of the blood pressure. So we may say that the vasomotor nerves are the stop-cocks in the blood-vessels. When they are turned off — vasoconstrictor action — the blood supply to a part is diminished; and when turned on — vasodilator action — the blood supply is increased.

THE CIRCULATION

84. Blood leaving a given place and returning to it again

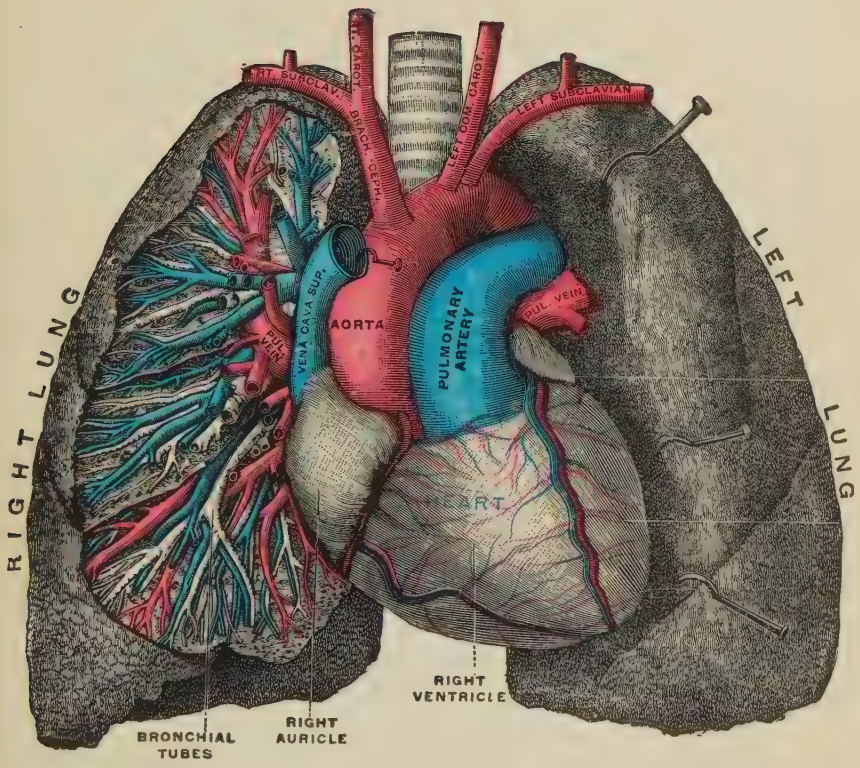


PLATE V. The Pulmonary Artery and Aorta

Front part of lung removed to show pulmonary vessels and bronchial tubes

must pass through at least two sets of capillaries and through the heart twice. Hence we speak of the pulmonary circulation, the systemic circulation, and the portal circulation.

In the pulmonary circulation, the blood is forced by the right ventricle into the pulmonary artery, which divides and carries the blood into both lungs. The pulmonary artery divides until it resembles the branching of a tree. The fine capillaries are scattered all about on the outside of the air-sacs, where the blood gives off its waste matter, gases, and carbon dioxid, and changes from blue to red, because it has taken up a cargo of oxygen from the air-cells. These capillaries are the termination of the pulmonary artery, and the beginning of four pulmonary veins, two from each lung. The pulmonary veins carry the fresh, vitalized blood to the left auricle.

85. The systemic circulation carries this fresh red blood to all parts of the body, where it leaves its oxygen, and so enables each little cell of the body to breathe. This is called internal respiration. In place of the oxygen, the blood takes up waste matter from the tissues, and the veins return the blood to the right heart.

86. The portal circulation is a part of the systemic circulation. The veins in the walls of the stomach, the intestines, the pancreas, and the spleen collect the blood from these parts, loaded with food absorbed from the digestive tract, and form the large portal vein, which flows into the liver and divides into innumerable capillaries. In fact, the blood filters through the liver. Then it is collected again into little veins, which finally form several hepatic veins. These empty into the inferior vena cava. The blood is thus carried to the right heart. There are no valves in these large veins.

87. In the adult the heart beats on an average seventy-two times a minute, faster when standing or exercising, slower when lying down or sleeping. In the new-born the heart

beats one hundred forty times a minute; at the beginning of the second year, one hundred sixteen times, and in the fifth year, one hundred times.

The contraction of the walls of the auricles and ventricles causes the heart-beat, and the force of this contraction is carried along by the blood in the arteries, giving rise to waves, which we call the pulse. In the capillaries, this wave is lost, so the blood then flows in a steady stream. If an artery is cut, the blood spurts from the end near the heart, and each jet of blood represents a heart-beat.

The time required for a complete contraction of the heart, rest, and dilatation, is eight-tenths of a second. The contraction of the auricles occupies one-tenth of a second; the contraction of the ventricles, three-tenths; rest, four-tenths.

88. As the heart contracts, it becomes smaller in all directions, and rolls upon its longest axis in such a way that the apex strikes the chest wall. The auricles contract first, and then the ventricles. Following each contraction there is a short pause, or rest. In twenty-four hours the heart obtains about fifteen hours' rest.

The first sound of the heart is caused by the contraction of the ventricles and the closing of the valves between the auricles and ventricles. If you listen to the heart, and place your finger on the large carotid artery in the neck, the first sound and the impulse under your finger occur at the same time. The second sound, which quickly follows, is due to the closure of the pulmonary and aortic valves.

The arteries are elastic, and so assist in forcing the blood onward. The blood enters the large arteries with great force, and this distends the vessels, and as quantity after quantity of blood is forced into these elastic tubes, the pressure is increased. When the small arteries are contracted, the blood does not flow so freely, and so the blood pressure is increased, and the heart beats more slowly. If the vessels are relaxed, the heart beats more rapidly and more easily. The capacity

of the capillaries is much greater than that of the aorta, and so the blood flows more slowly through the hair-like tubes. In the aorta, the blood flows at the rate of fifteen inches a second, while in the capillaries it flows from one-fiftieth to one-thirtieth of an inch a second. The blood makes a complete circuit in less than a minute.

HYGIENE OF THE BLOOD

89. If anything happens to prevent the blood-corpuscles from reaching any part with their cargo of life, that part will decay and die in less than two days. The health of every cell depends upon the freedom with which the blood flows to it. The more perfect the freedom, the more perfect the health.

The health of the blood depends upon the food eaten, the water drunk, the air breathed, and upon exercise, sunshine, rest, sleep, and peace of mind.

The blood is made from food. If the food is pure and wholesome, the blood will be pure and healing. If the food is poor in quality or quantity, the blood-cells are starved, and grow pale and lifeless, and in turn every cell of the body is poorly nourished. By drinking an abundance of pure, fresh water, the blood is purified and bathed, and cleansed from all waste and poisonous matter. We can live longer without food than without water. In thirst every one of the billions and billions of blood-cells, as well as every other cell of the body, is crying for a drink. Eating salty food creates thirst, because salt robs the blood of water.

90. Sunlight exerts a mysterious but wholesome influence upon the blood. Human beings as well as plants need the sunlight. Marvelous results are obtained to-day by the use of the electric light, which is modified sunlight, in curing what have been considered for years incurable diseases. Sunlight is indispensable to health, and as its influence is felt in every dark corner of the living body, each cell works

more briskly and skilfully in the performance of its task.

91. Exercise is essential in promoting the health of the blood. During rest the blood and the lymph flow more slowly through the muscles and the tissues. This permits waste matter to collect among the cells, diminishing their activity, and poisoning the nerve endings in the muscles. So when a muscle has not been used for some time, it feels sore after exercising, because of the accumulation of waste matter. All the muscles should be exercised once or twice daily. This will increase the flow of blood and lymph through them, and cause all this waste material to be carried to the proper organ, where it will be thrown out of the body. Exercise increases the strength of the heart, which in turn forces the blood currents on more swiftly, carrying health to every part.

92. When the blood is loaded with poisons or useless things, or overloaded even with wholesome food, it flows more slowly, and all the cell workers are hindered.

The flowing of the blood and its healing power form one of the great mysteries of the living palace. It carries life and health to the cell, and death and decay away from it. It can as truly be said to-day as to ancient Israel, "I am the Lord that healeth thee," for it is his power, and none other, that heals the body and keeps it in repair.

93. Whatever is done affects the blood. Happiness causes it to flow more freely, and the corpuscles get their supplies of food more promptly. Confidence and hope relax the blood-vessels, and the blood-cells are borne along faster and more freely to every part. Fear poisons the blood, and weakens the heart. The blood can not move properly; the body is chilled. Grief also slows the stream of life, and has a depressing influence upon every cell worker.



CHAPTER X

The Pathway of Air

94. Two important entrances of the body are located in the face. One is the mouth, the beginning of the pathway over which food and drink travel. The other is the nose, which marks the beginning of the respiratory tract.

95. The nose not only gives expression to the face, but it contains the endings of the special nerve of smell; so in its soft, wet membrane is located the sense of smell. In the two nasal chambers are many curious structures. These chambers are about three inches long, and open into the pharynx. Between these chambers is a partition, called the septum. In many persons the septum is bent to the right or left, and may obstruct the breathing. As the air passes through these little rooms, it is warmed and prepared for the lungs. The moist mucous membrane lining the nasal chambers catches much dust and dirt.

When one has a cold in the head, the mucous membrane of the nose is congested with blood, and so closes up the air spaces, making breathing very difficult.

The nose is the only proper entrance for air. In the beginning, the Creator breathed into man's "nostrils the breath of life; and man became a living soul." Those who follow the divine order will live longer than mouth breath-

ers. There is much wisdom in the adage, "Shut your mouth and save your life." Mouth breathing in children is a serious matter, and a physician should be consulted. Mouth breathing deforms the face, causes catarrh of the throat, weakens the lungs, and deforms the chest.

Mouth breathing is usually due to adenoids, or a growth of the pharyngeal tonsil in the upper part of the pharynx.

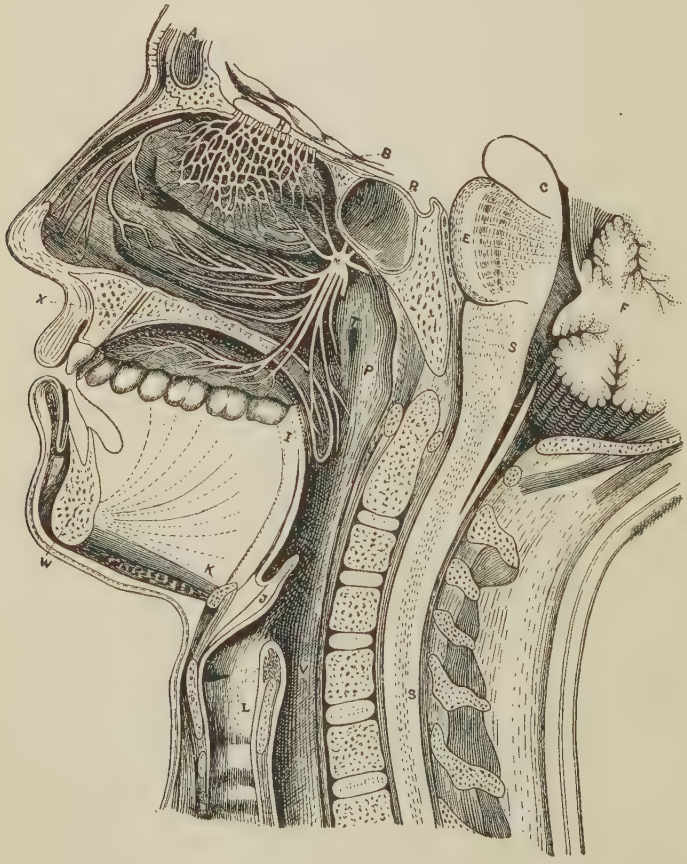


FIG. 39

(A) Frontal sinus, (B) olfactory nerves, (C) crus cerebri, (E) pons, (F) cerebellum, (H) olfactory bulb, (I) soft palate, (J) epiglottis, (K) hyoid bone, (L) larynx, (M) Meckel's ganglion, (N) nasal nerve, (P) pharynx, (R) sphenoid sinus, (S) spinal cord, (T) Eustachian tube, (V) œsophagus, (W) jaw-bone, (X) hard palate

These obstruct the passage for the air, and often interfere with the hearing. Adenoids can be removed only by an operation, and delay should not be permitted except for some very good reason.

96. From the nose the air passes through the pharynx, a large space back of the tongue, which has seven openings into it,— two from the nasal chambers, two from the ears, one from the mouth, one from the lungs, and one from the food canal.

From the pharynx the air passes into the larynx, or voice box, and thence through a small opening, called the glottis. The walls of the voice box are made of cartilage, which you can distinctly feel in the throat. This is called Adam's apple. At the top of the larynx is a little door of cartilage, that moves on a hinge. It is called the epiglottis, and closes down on the top of the larynx when food or drink is swallowed. When one breathes, it is open. "Swallowing the wrong way" is caused by something passing this door and falling into the voice box, or trachea.

97. In the voice box are two very delicate, thin, pearly white bands, or cords, the vocal cords, by means of which we talk or sing. The cords are nearly parallel, and so placed that as the air comes out of the lungs, it passes over their free edges and makes them vibrate, thus causing a sound. In normal breathing the cords do not vibrate, because they are not drawn tight. If they are very tight, the sound will be high. If the tension is moderate, the sound will be low. A number of little muscles are placed in the larynx to act upon the vocal cords, drawing them together, and separating them, some to make them tight, and some to loosen them, so that every action is under the control of the mind.

Here in this little space is a wonderful instrument. The larynx, together with the trachea, the lungs, and the muscles of breathing, form a grand reed organ, a living instrument, to be operated by each individual. This is the instrument

that is used to express thoughts, feelings, wishes, needs. It does not play without direction. When cultivated and trained, there is no musical instrument comparable to it.

98. The human voice is a sacred gift. It can be trained to utter the sweetest and most musical sounds in all nature.

The voice is used in speech or in song. Speech, as well as song, may be music. That depends upon its use. The words and the tones of the voice show the thoughts. Angry thoughts produce angry words, that will make others angry. Kind thoughts will be expressed in word and tone. "A soft answer turneth away wrath; but grievous words stir up anger."

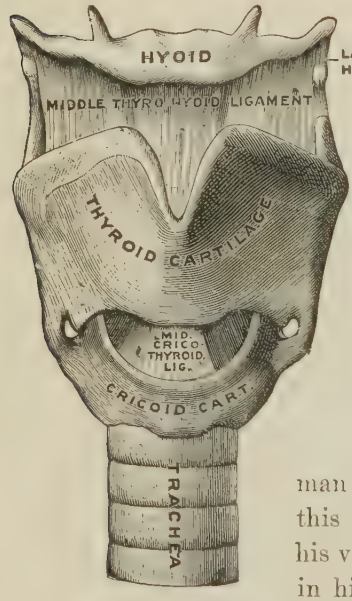


FIG. 40
The voice box

Speech is one of God's best gifts to man. It is given to man alone. No other animal has this gift. A man who can not use his voice in speech is greatly disabled in his life-work. How long it takes the deaf and dumb to learn to communicate with others! How lonely you would be if you could not talk to any one of all you think and feel!

In speech not only are the vocal cords used, but the tongue, the cheeks, and the lips are necessary. Hearing is also necessary to plain and correct speech. Children learn to talk by imitating the sounds they hear.

In a certain sense the voice is born in the living organism. The quality of the vocal cords, the size and shape of the pharynx, the shape of the walls of the pharynx and larynx,

the size and shape of the mouth, the tongue, the teeth, — all these are determined in the great workshop of nature. Now and then there is built into some human body a voice organ so rare, so powerful, so sweet, that all who hear it are enchanted. If the owner of such a voice organ has a soul and a mind to correspond, his influence over the hearts of men is almost boundless.

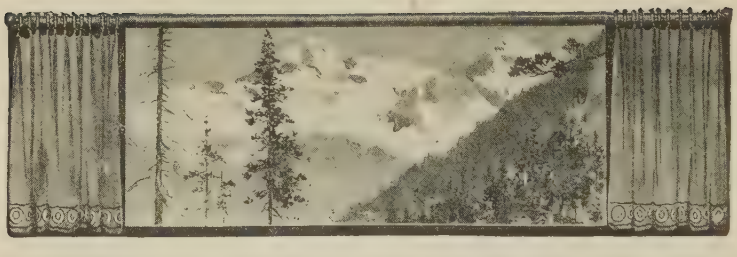
But even the ordinary vocal organ may be trained to give only harmonious and musical tones. Every word should be spoken distinctly, pronounced correctly, plainly, softly. The voice should be studied as would be the piano or the violin. If the thoughts are all pure and beautiful, no others will be expressed.

99. It is just as true of the voice as of all other parts of the living palace, that to keep it strong and perfect the whole body must be in health. The voice is particularly injured by the use of alcohol or tobacco, also by foods containing much animal fat. Vinegar makes it harsh.

The voice is injured by using it in damp or badly ventilated rooms, and by improper breathing.

A cold thickens the vocal cords, and so fills them with blood that they can not vibrate, causing hoarseness.

To have a voice that is clear and sweet and fresh, eat plenty of fruit, take a cold sponge bath every morning, breathe fresh air, and sleep from eight to ten hours every night.



CHAPTER XI

The Pathway of Air (Continued)

100. The air passes through the nose, through the pharynx, into the voice box, and from there it passes on through a round, stiff pipe, commonly called the windpipe, or trachea. It is about four and one-half inches long, and its stiff walls are formed by about twenty incomplete rings of cartilage. It passes downward, and divides behind the breast-bone into two tubes, called the bronchi. One bronchus goes to the right lung, and the other to the left.

At the end of the trachea, part of the air turns to the right and part to the left. The bronchi divide and subdivide into bronchial tubes, down which the air passes until it is lost in a network of narrow corridors, that grow smaller and smaller, smaller than knitting needles, smaller than sewing needles, finally, again, like the branching arteries, as small as hairs. These are the capillaries. But the capillaries of the lungs are larger than those of the arteries. The air at last reaches the cells, the tiny air-cells, or sacs, or rooms, where the mystery of breathing takes place.

The lungs are inside a larger room, called the chest. The chest, in turn, is one of two main rooms that make up the trunk. The trunk is all of the body except the head, the arms, and the legs. The lower room is called the abdomen.

Besides the breathing rooms, or lungs, the chest contains the living fountain, the heart.

You have probably seen the lungs of a dead fowl. They are vulgarly called the lights. The lungs are pink, smooth, and soft to the touch. They will float in water, because they contain air.

The breathing rooms and the living fountain are shut in and protected by a bony wall. This bony wall is formed by the breast-bone and the collar-bone in front, by twelve pairs of flat, curving bones, called ribs, that extend in front, on the sides, and behind, and by the back-bone and the shoulder-blades. All the bony walls are padded outside and between by many muscles, which also help to protect these vital parts.

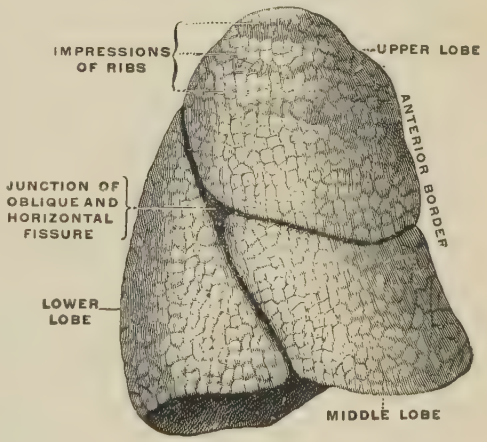


FIG. 41
The right lung

There is the closest relation between the heart and the breathing rooms. The living fountain is placed directly between the two lungs. Every time a deep breath is taken, the lungs expand in front of the heart so as almost to cover it. The upper part of each lung, like the lower end of the heart, is pointed, and is also called the apex. The apex of the lung reaches up into the neck above the collar-bone. The lower part of the lung, like the upper part of the heart, is broad, and is also called the base. The base of the lung rests upon a muscle, called the diaphragm. The diaphragm is the partition between the chest, or thorax, and the abdomen.

There is a constant double communication between the heart and the lungs. Seventy-two times a minute the heart beats, and the stream of life flows through the right auricle, into the right ventricle, through the pulmonary artery, between the millions of tiny air-cells that make a vast network of meeting-places for the blood and the air.

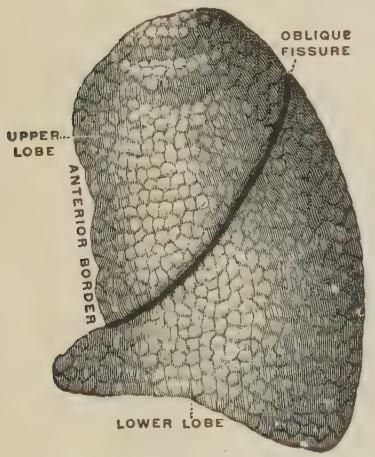


FIG. 42
The left lung

To get an idea of the shape of the lungs, just imagine that a great tree is before you. The two large branches are the bronchi. The small branches, the twigs and the stems, are the bronchial tubes and the narrowing passages that lead to the air-cells, or the leaves.

Although the air-cells in the lungs are not so large as oak leaves, they are more numerous than the leaves of a tree. In a normal pair of lungs there are about seven hundred twenty-five million air-cells. If these were all spread out on a flat surface, they would cover a lot fifty feet long and forty feet wide. This is your breathing surface.

101. The capillaries of the lungs are the final passages through which the blood flows to seek the air. There are millions of capillaries in the lungs. They wind among the little air-tubes and twine about the air-sacs as a vine winds and twines among the branches of the oak. The walls of these tiny cells and of the capillaries are thinner than the walls of soap-bubbles. Hence it is the slightest film that separates the air and the blood.

It is here that the mystery of breathing takes place. It is here that the air and the blood intermingle. It is here that

is breathed the breath of life. It is here that the poisons, the wastes, the impurities brought by the stream from all parts of the temple, are exchanged for oxygen and sunlight. It is here that the blood is purified. It is here that the little red corpuscles unload their débris and take on a fresh cargo. It is here that the color of the blood is changed from purple to bright red. From here, from the little breathing rooms, the stream of life, renewed and pure, is ever starting on its sacred mission of health and healing.

We can follow the path of the blood to the capillary. We can follow the path of the air to the air-cell. We can tell how much oxygen is taken into the blood, and how much carbon dioxid is given off. But there we stop. The power by which life is breathed into matter, by which air and sunlight, food and water, are made into blood, by which the blood and the breath possess healing and building and life-giving powers,— this is another of the divine Architect's secrets.

All the walls of the air-passages and of the branches of the bronchial tubes, except the walls of the little air-cells and of the tiniest tubes into which they open, are covered with that wet and soft lining, mucous membrane. In the lungs this lining is covered with little living workmen, curious cells that stand out in rows from the walls at any angle, and are busy working night and day. On the top of each little mucous membrane worker's head are several fine, microscopic hairs, called cilia, that are constantly waving toward the larynx. They work all the time, fanning dust and particles of dirt out of the lung into the throat. They never by any mistake fan backward, but keep the air moving toward the music room. If you have ever seen bees fanning air into a hive, you will understand this. If the air-tubes of a frog are taken out, and a speck of white paper is put on the lower part of the mucous membrane, it will travel over the cilia toward the larynx fast enough to be seen.

The lungs are free to move on all sides except at one place, called the root of the lung, where they are fastened to the back-bone. The root of the lung is made up of air-tubes, arteries, veins, nerves, lymphatics, all of which go to the lung or lead away from it, carrying food, water, and messages, just as they do to and from every other part of the body.

102. The normal adult breathes about eighteen times a minute. Each rise and fall of the chest indicates one breath. The movement of breathing is produced by the action of nearly one hundred muscles.

103. The diaphragm, the muscle which forms the partition between the chest and the abdominal cavity, is the most important muscle used in breathing. It is dome shaped on the upper surface, and curved on the under side. The diaphragm makes a movable floor to the chest and a movable roof to the abdomen. To draw the outside air into the lungs, this muscle contracts, and the dome is flattened. This makes the chest room larger. The lungs, resting upon the diaphragm, follow it when it moves down. The lungs expand, and tend to make a vacuum. The air rushes in to fill the vacuum. This is called breathing in, or inspiration. The movement is helped by twenty-two pairs of little muscles between the ribs, called the intercostal muscles.

To expel the air from the lungs, the diaphragm relaxes, and the muscle returns to the dome shape again. The lungs are elastic, like a rubber bag, and so they return to their normal position, and the air is forced out. This is expiration, or breathing out.

In singing or talking, the air should be forced out by the diaphragm and the muscles of the abdomen. Some people try to sing or talk by using the little muscles in the music room. But these little muscles are not large enough or strong enough to do the work, and so the people using them become very tired, and sometimes even sick. It is a bad practise thus to abuse the muscles of the larynx, as well

as to neglect the large, strong muscles that were especially made to force out the air. If you will notice a calf bawling or a dog barking, you will see its sides moving and the muscles of its belly contracting in the proper manner. The calf or the dog never tries to use the muscles of its larynx in producing sound.

104. All the air in the lungs is not changed every time we breathe in and out. Normally we breathe into the lung at one time about thirty cubic inches of air. This is called the tidal air. It comes and goes without special effort. If you take a deep, long breath, if you try to see how much air you can possibly breathe in, you will take in a hundred cubic inches more. This extra hundred cubic inches is called the complemental air.

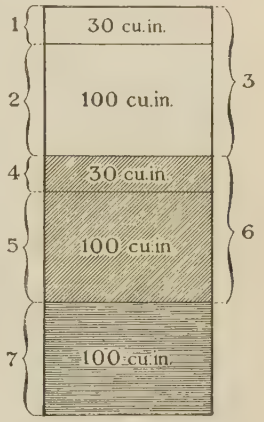


FIG. 43

(1) Ordinary inspiration, 30 cu. in.; (2) complementary air, 100 cu. in.; (3) maximum inspiration, 130 cu. in.; (4) ordinary expiration, 30 cu. in.; (5) supplemental air, 100 cu. in.; (6) maximum expiration, 130 cu. in.; (7) residual air, 100 cu. in.

When the ordinary work of the living body is going on, this extra air is not needed. But suppose some sudden danger arises, so that in order to escape one is obliged to run; if he could not breathe more than thirty cubic inches of air at once, the little blood-vessels could not begin to supply the muscle workers with food and water fast enough to make the legs go at the top of their speed. So the Builder of the living palace has left space in the chest cavity for just such emergencies.

105. Normally one breathes out about thirty cubic inches of tidal air. By an effort, he can breathe out about one hundred cubic inches more. This is called the supplemental air.

106. Besides the tidal air, the complemental air, and the

supplemental air, there is the air that always remains in the lungs. No matter what one does, he can not force all the air out of the air-cells. About one hundred cubic inches constantly remain in the lungs. This is called the residual air. Without the residual air there could be no life.

THE BREATH OF LIFE

107. The mystery of life is the mystery of God. The divine Word says: "I am the Life." "In Him we live, and move, and have our being." "In whose hand is the soul of every living thing, and the breath of all mankind." "He giveth to all life, and breath, and all things." "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life; and man became a living soul."

This defines and bounds the mystery. We know that God is Life and the Giver of life; but what that life is and all that it may be is still as far above and beyond us as the understanding of God himself.

In making man, the divine Architect "breathed into his nostrils the breath of life." This breath of life is as great a secret as the mystery of the conscience.

Breathing is not the breath of life; but to live we must breathe. Air is not the breath of life; but to breathe we must have air.

Every living thing in order to live must breathe the air. The tree breathes the air through its leaves. The leaves are in a sense the lungs of the tree. Insects breathe the air through tiny openings in their bodies. Frogs breathe the air partly through the skin. Fishes breathe the air by taking oxygen out of the water as it passes over their gills. Men breathe the air through the air-cells in the lungs. There is no mystery about the air as a necessity to breathe.

The air, too, is one element of life that no one can keep to himself or corner. It can not be collected into a storehouse

and sold at a high price. It is free to every living creature. "Free as the air" is the highest superlative of free.

Air is a food. It is just as truly a food as is bread. Men have lived for weeks without food; some have lived seven days without water; but one can not live five minutes without air.

When the air enters the body, it contains twenty-one parts of oxygen and seventy-nine parts of nitrogen. When it is breathed out, it contains sixteen parts of oxygen, seventy-nine parts of nitrogen, and five parts of carbon dioxid.

Oxygen, nitrogen, and carbon dioxid are gases. You have seen what becomes of oxygen in the body. Nitrogen, in some forms, is a terrible explosive, but in the form in which the great Creator has placed it in the air, it enters the lungs and passes out again without the least danger to the body. Carbon dioxid is a gas — a waste matter — produced by the burning of food and tissue.

When the air is breathed out of the body, it also contains moisture. By breathing on a looking-glass, this may be seen. When one breathes outdoors on a frosty morning, the breath "steams," because the moisture is condensed into a visible vapor.

Air once breathed is not fit to breathe again. It is full of poison. If it is breathed again, it will poison all the little body workers. That is why a close room, where the air is breathed over and over, causes sleepiness and headache. The little nerve-cells are dulled from the poison. They are trying to tell, by the headache, that one must go outdoors and get them some fresh air, or open the windows and let it come in.

108. People who live in poorly ventilated houses can not be healthy. They lack energy and ambition, and after a while become sick and diseased.

109. No one should ever sleep in a bedroom with closed windows and doors. At night while you sleep, the sym-

pathetic workers and many other little workers are very, very busy cleaning up after the day's work, repairing broken tissue, replacing worn-out cells, carrying away the rubbish, and making everything ready for another day's activity. If you sleep in a close room, instead of supplying them with oxygen and other food which they must have for this work, you are giving them poison, which will make them slow and stupid. If you wake in the morning tired and cross, it is because the little workers you have been misusing are tired and exhausted. By lowering the windows several inches, or providing for the entrance of fresh air in some other way, you can avoid much of this, and supply your faithful cell workers with the pure, fresh air they need. Air may be cold yet not fresh.

110. Every day the doors and windows of your house should be opened, to change the air throughout. Especially the doors and windows of sleeping-rooms should be opened. The bedclothes and the pillows should all be taken from the bed and thoroughly aired. Nearly one-third of our time is spent in bed, so it is of the greatest importance to have the bed and the bedroom fresh and sweet.

Not only should every room in the house be supplied with fresh air and sunlight, but the cellar, also, should be aired regularly. No decaying vegetables should be left to manufacture poison. All the drains should be examined often.

Every time a grown person breathes, he poisons nearly a barrelful of air. So every person in a room needs three thousand cubic feet of air an hour. When you come from outdoors into a closed room where there are people, you often notice a bad odor in the room. That bad odor is caused by waste matter cast out of the lungs, and is a warning to your nerve workers that the air is poisoned and ought not to be breathed again.

111. Once, a hundred years ago, some natives of India captured one hundred forty-six British men and women,

and made them all prisoners. All of these people were put into one little room in the ground. The room had only one small window. The night was hot and sultry. All could not get to this one window for fresh air, and the little opening was too small to supply so many lungs. In the morning one hundred twenty-three of the number were dead.

Cold air is better for the lungs than warm air. How refreshing is the cold air of a frosty morning! Warm air is debilitating if breathed continuously. The air we breathe indoors should not be warmer than sixty-five or seventy degrees.

Outdoor air is far better for the lungs than the air of any house. The great ocean of air outside is always in motion, and so is fresh and pure. In the house it becomes foul, like the water in a stagnant pool. It needs the wind and the breeze and the sun to keep it wholesome. It can not purify itself. Not many people die suddenly from bad air, but thousands are dying slowly because of living and sleeping in poorly ventilated and overheated rooms. Air and sunlight are God's free gifts. They are the finest materials for the body structure. If we debar the air and refuse the sunlight, we alone are to blame if the temple does not grow fair and stately; if the little workers are poisoned and die; if the beautiful building of the body becomes a ruin and falls to pieces.

It is a crime against the Builder of the body to crush in the little breathing rooms and destroy the shape of the chest by wearing tight clothing. The Architect left the lungs free on purpose. You could not crush in your head or your hips with a corset. They do not need any more room at one time than another. But the breathing rooms do. If you force in the ribs against the lungs and leave the little air-cells no room to expand, you are coming in brutally to hinder the meeting of the air and the blood. You are taking your own life, just

as surely, if not so swiftly, as if you tied a halter around your neck.

112. Nothing helps more than a fine pair of lungs in making the work of the body move briskly and well. To strengthen the lungs you must exercise them. Cold bathing is one good exercise. It makes you breathe deeper and faster. Dash some cold water on your chest, and see. When you breathe faster, the blood flows more quickly into the lungs, and so is more rapidly supplied with oxygen, and purified.

113. Another good way to strengthen the lungs is to take breathing exercises. Deep breathing morning and evening does much to maintain the health, by burning up poisons and waste substances in the tissues; by increasing the power of the circulation; by stimulating the liver and intestines, and improving the digestion.

114. Never sit or stand with the shoulders bent forward. Never lean over a desk or a book. Keep the chin in, the chest up and forward, and the shoulders back.

115. In going from a warm room into the cold air, be sure to breathe through the nose. If you feel cold at any time, take deep breathing exercises for a few minutes. This will warm you.

To take a deep breath and to hold it will help you to bear pain. A long, deep breath held as long as possible, will sometimes stop the hiccough.



CHAPTER XII

A Living Manufacturing Plant

116. The materials found in nature for the service of man are still more or less in a crude state. Iron mixed with rock deep in the earth is of little use. But when mined, and melted, and made into steel, it can then be manufactured into various kinds of machinery and implements, all of which are of the greatest utility. The tree has to be cut down, and sawed, and seasoned, and planed, and polished, and worked over, before a beautiful piece of furniture appears. A diamond found in the earth is covered by an opaque layer of stone, which has to be removed, and then it must be cut and polished before it is called a gem.

This is all very simple, when compared to the changing of food and drink into living, moving bodies. To turn bread and butter, cereals, potatoes, apples, and all the other foods we eat, into suitable materials for body building, is one of the strangest and most complex of all the strange and mysterious processes that are constantly going on in the living body.

The digestive system is especially adapted to this work. Digestion is simply the turning of foodstuffs into a form suitable for body building. Food must enter the blood before it can be carried to the cell workers. A grain of wheat, an apple, a piece of bread, can not enter the blood. As a grain of wheat, an apple, or a piece of bread, it can not even

enter the body. Food that is in the mouth or stomach is still outside the body. Before it can enter the body and become a part of it, it must go through certain changes. It must become so changed that it can pass through the walls of the food canal into the blood, and on into the lymph. If it fails to do this, it never enters the body; it never becomes food; it does no more good than if held in the palm of the hand or placed in your pocket. So the digestive system is a living manufacturing plant, preparing materials for body building.

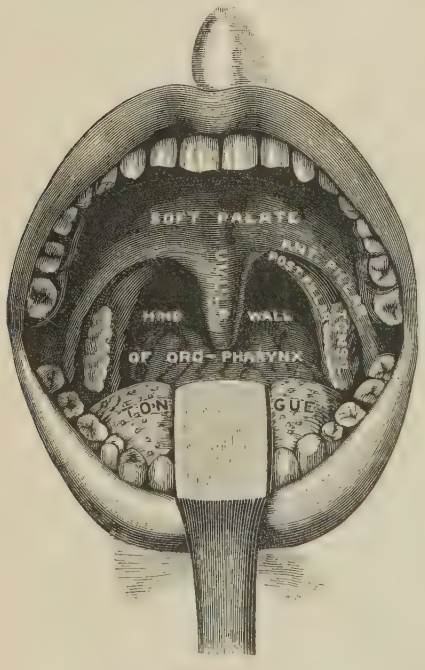


FIG. 44
The receiving room

THE RECEIVING ROOM

117. The mouth cavity may be said to be the receiving room, the sorting room, the preparation room. The taste-buds act as food receivers. The tongue, teeth, cheeks, and lips are the sorters; and the teeth and salivary glands prepare the food material for the next room.

The taste-buds are assisted in their work by the sense of smell and the sense of sight. Food that appeals to all three of these special senses is quite sure to be digested.

The surface of the tongue is dotted all over with little red mounds or hillocks. We usually speak of them as papillæ. They vary in size and shape, and are more numerous on the front part of the tongue. On the back part of the tongue there are eight or ten large mounds, arranged in the form

of a letter V. The sense of taste is associated with these little red elevations. The mounds project above the surface of the tongue, and are round. On the sides of each are peculiar little bodies, arranged in a circle around the mound. These are the taste-buds. They present a very interesting study under the microscope. The taste-buds are the special endings of the nerve of taste. When stimulated by any substance that has taste, this stimulation becomes converted into a sensation in some way (we do not know how), and this sensation travels to a certain area in the brain, where we actually taste. If the nerve of taste were cut, the taste-buds could be stimulated, but we should be unconscious of it. We are responsible, therefore, for all that we swallow.

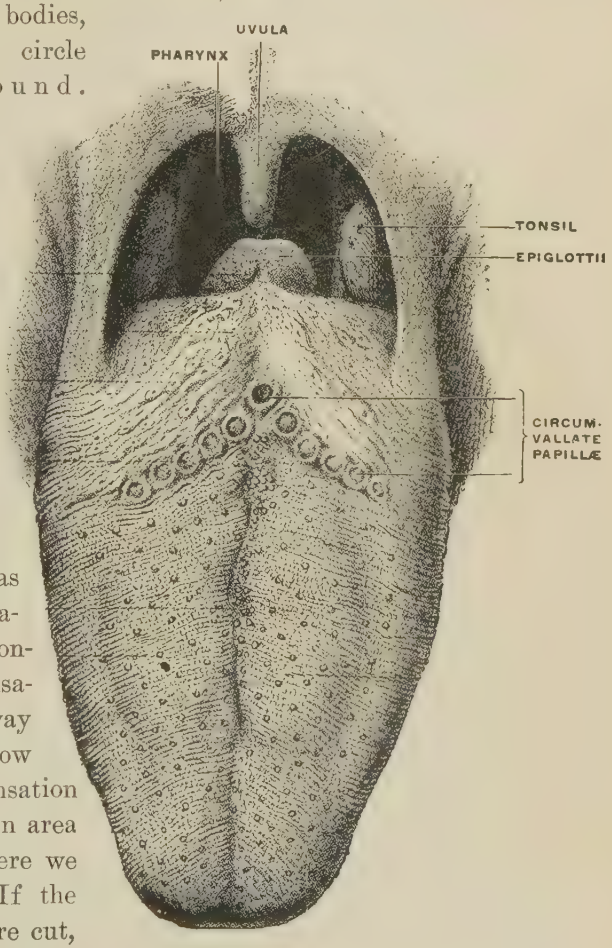


FIG. 45
The tongue, showing the papillæ

Sweet flavors are best tasted on the tip of the tongue,

acids on the sides, and bitter substances at the base. Many flavors that we think we taste are recognized wholly by the sense of smell. A food that has no taste or flavor does not do the body much good. The stomach gives it no more attention than if it were carefully placed there while you were asleep. Professor Pawlow, a noted Russian physiologist, has recently thrown much light upon the influences of the senses upon digestion by experiments made upon dogs. He placed food in the stomach of a dog through an artificial opening, while the animal slept, and very little gastric juice was formed in several hours; but when he placed fresh meat just out of reach of the same dog, letting the dog see him cut it up and get it ready, the gastric juice appeared in five minutes, and flowed copiously.



FIG. 46
Taste-buds

The fact that the taste-buds were placed in the first stopping-place of food is a very strong indication that they serve an important purpose. From the manner in which many eat, one gains the impression that they have no taste-buds, for the food tarries but a moment in the mouth, and is then precipitated into the stomach.

All wholesome food should be agreeable to the taste, and eating should be a real pleasure, but never carried to the point of satiety. Those who eat from a sense of duty would do well to refrain from food until a real desire for food is produced. Another class of individuals, who wear a thick coat — of germs and their poisons — on their tongues for weeks at a time without a change, miss much of the intended

pleasure of eating, and deprive their bodies of a natural, wholesome stimulus.

There are no taste-buds in the esophagus, nor in the stomach; hence it is folly to eat with haste. It is evident from the physiology of taste that nature intended food to remain in the mouth so long as it stimulates the taste-buds. Food is ready to be swallowed only when the taste is gone, or nearly so. Fluids were not intended to remain in the mouth. The real pleasure in eating does not consist so much in swallowing as in tasting. When one eats properly, the entire body is relaxed, the blood circulates freely, and there is a general feeling of well-being.

Crushing the food enhances its flavor, and hence stimulates the taste. For this reason, thirty-two strong teeth are placed in the mouth. So long as a mouthful of food is not in a finely divided state, taste is possible, but as soon as it is thoroughly masticated and mixed with saliva, taste quickly disappears. Take a nut meat, or a crust of bread, or an apple, and try this. Children who are taught to eat slowly and to masticate thoroughly every mouthful of food, are much less likely than others to have throat troubles and nasal obstructions.

Thorough mastication can not be too much emphasized, for it sustains an exceedingly important relation to health. To eat properly requires a great deal of self-control. It is an indication of character. Foods otherwise indigestible may be rendered very digestible by thorough mastication.

The act of chewing the food is a stimulus to the salivary glands, of which there are six, and so there is a copious flow of this digestive fluid during mastication, especially when the food is dry. The saliva not only moistens the food, making swallowing possible, but it acts upon and converts starch into sugar, or maltose.

The taste-buds select the food, and the teeth, the tongue, and the salivary workers prepare it for the next department

in the living factory. Then it must be swallowed. This act is called deglutition. In answer to a question, a little girl once stated that the home of the swallow was in the stomach. This is very true, inasmuch as the object of swallowing is to place the food in the stomach. Swallowing is an easy matter, yet it is a very complex process, for it requires the harmonious action of nearly sixty muscles. However, it is involuntary most of the way, and so we do not have to think of these muscles.

118. In the adult the alimentary or food canal is about thirty feet long. It is about ten times as long as the trunk. In flesh-eating animals it is much shorter.

There are many stopping stations along the canal, where the necessary changes take place in the food. Each part of the canal and each stopping station has a special name and a special business. There is, first, the mouth, or entrance; second, the pharynx; third, a long, round passage, called the gullet, or esophagus; fourth, a large waiting station, called the stomach; fifth, a canal proper, a very winding and curved canal about twenty feet long, called the small intestine; sixth, a junction, shaped like a sac or pouch, called the cæcum; seventh, a large canal about six feet long passing up and around the coiled canal, and called the large intestine, or colon; eighth, the final part, or rectum, closed by a muscle at the anus. Two smaller canals empty into the intestine near the stomach. One comes from the liver, and the other comes from the pancreas.

The alimentary canal runs back of the larynx, the lungs, and the heart, down through both main rooms of the trunk,—the chest and the abdomen. With its large stopping station, the stomach, and its coiling and winding parts, it takes up most of the space in the abdomen. It makes a complete passageway through the body. It is lined throughout its entire length by mucous membrane, or, as it is sometimes called, the internal skin. By looking at the lips you can

see where the external skin ends and the internal skin, or mucous membrane, begins.

In the first portion of the food canal, the mouth, are the teeth, the tongue, and the tonsils; and emptying into it are the ducts from the salivary glands.

119. The teeth assist in the first process of digestion, by crushing and grinding the food. This is called mastication.

The first teeth of the child are of short duration, and so are called the temporary or milk teeth. The set consists of twenty teeth. The first milk teeth appear about the sixth month. By the sixth or seventh year most of the permanent teeth have replaced them. Each permanent tooth, as it grows, pushes a milk tooth up, so that it is loosened and finally drops out.

The lower or middle incisor teeth appear first, then the corresponding upper teeth, next the lateral upper incisor teeth, then the lateral lower incisors. The upper canine teeth, called eye teeth, and the lower, the stomach teeth, appear usually in from the eighteenth to the twenty-fourth month. All the molars have usually appeared before or during the third year. The permanent teeth are thirty-two in number.

It is the business of the teeth to grind everything to pieces that comes between them. Mastication is necessary for the food, and necessary for the teeth. The teeth must bite and grind and chew, or they will decay. As truly as any other body workers, they need exercise to keep them strong. If none but soft foods are eaten, or if the food is hurried through the mouth, the teeth will grow weak for want of work. On the other hand, they were not intended to be used in cracking nuts, cutting wires, or biting threads.

The chewing surface of the tooth is called the crown. This is the part that is covered by enamel. The second part, or neck, is under the gum. The third part, or root, is tightly

fastened into the jaw-bone. A tiny nerve and a little blood-vessel run into the root of each tooth.

If the teeth are damaged or broken, the food enters the canal in bad shape. If one tooth only is gone, the food can not be evenly chewed. If the teeth are not kept clean, little particles of food collect between them, ferment, and form an acid that destroys the enamel and makes the teeth decay. If the tiny nerve of the tooth becomes exposed to the air and to germs, toothache is caused. One reason why toothache is so much worse than many other pains is that little can be done to relieve it. If the little nerve cries out, "There is a hole or germ down there," a message can not be sent to jerk the tooth away. A dentist must be employed to stop the hole or remove the germ. But the little nerve worker keeps crying out, as it was made to do, until that part of the building is repaired.

The appearance of the teeth is a very good indication of the character of the person. If the front gate of a man's yard is broken and dirty, it is more than likely that the man himself is lazy and slovenly.

Cleaning the teeth regularly keeps the mouth sweet, the teeth white and sound, and prevents unseasonable decay. Early decay of the teeth indicates premature old age.

120. The salivary glands, six in number, take from the blood the materials to make saliva. Solid and especially dry food excites a great flow of saliva to prepare it for the stomach. The mixing of saliva with food is the second process of digestion, called insalivation. Liquid foods are already prepared for swallowing, so excite very little flow of saliva.

THE MIXING-ROOM

121. This is the stomach. The stomach is a secreting gland, a hollow muscle, a place where foods are thoroughly mixed. In the new-born babe it holds about five-sixths of an ounce, which would be nearly two tablespoonfuls, and for

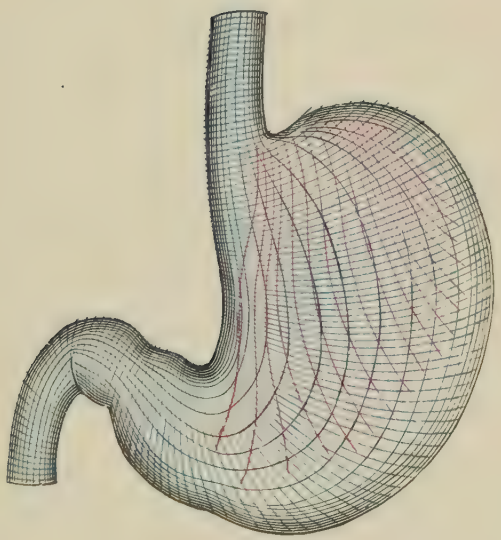


PLATE VI. The Stomach

Diagram showing direction of the fibers in the three muscular layers

some time it gains about an ounce in capacity a month. In the adult the normal capacity is from three to five pints. The stomach is suspended in an oblique position, downward from left to right, and downward and forward from the spinal column toward the abdominal wall. Five-sixths of it is on the left of the middle line of the trunk, and hence is mostly under the ribs and below the diaphragm, while the right end is covered by the liver. The lower border of a normal stomach is about two inches above the navel.

The stomach has two openings. The upper one, the cardiac opening, leads from the esophagus into the large end of the stomach. The lower opening is at the small end of the stomach, and is called the pylorus, from two Greek words, meaning both guard and gate, or, in other words, the gate-keeper. The pylorus opens into the small intestine. Both of these doorkeepers are composed of muscular bands that operate like puckering strings.

The stomach is able to contract in all directions. It does this by means of three layers of muscles. The outside layer contracts the long way of the stomach; the middle layer, the short way; and the inside layer, obliquely.

Inside the inner muscle layer the stomach is lined with the wet skin, or mucous membrane, which hangs in folds or stretches out as the muscles contract or expand.

In this soft, velvety lining there are many millions of little gland workers, called peptic glands and pyloric glands. The fluid formed by the peptic glands is called gastric juice, and it consists of pepsin, rennet, and hydrochloric acid. It is marvelous to see the amount of work these little glands do in a day. They turn out from ten to twenty pints of gastric juice each day, or about one-tenth of the body weight. This all comes from the blood. That which is not needed for the digestion of food is again absorbed. There are many ways in which the body practises economy.

While the digestive process is largely presided over by

the sympathetic nervous system, the movements of the stomach and the secretion of gastric juice are principally under the control of a pair of very large nerves, called the pneumogastric nerves, which proceed directly from the brain. These nerves not only control the secretion of gastric juice, but they also cause the pancreatic juice to flow into the intestine.

About five minutes from the time the taste center in the brain is excited by food, or the thought of food, the gastric juice begins to trickle out of the wall of the stomach in tiny drops; at the same time, the entrance of food causes the stomach to begin a slow churning movement, which becomes more active as the food is prepared to be passed on into the next room, the intestine. This movement is called peristalsis, and continues so long as food remains in the stomach; but if the latter is exhausted by too much work, peristalsis stops. This movement forces the food back and forth over the surface of the stomach, where it is drenched with gastric juice. The breaking of the food with the teeth is mechanical; the continuation of this process in the stomach is partly mechanical, but principally chemical.

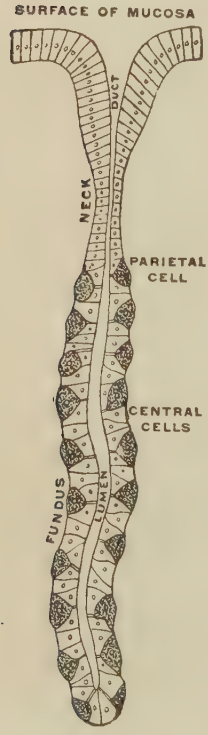


FIG. 47
Cells that form the gastric juice

The gastric juice does not act upon starch, fat, or sugar. It begins the digestion of the food element called proteid, as found in oats, wheat, bread, corn, barley, beans, peas, lentils, milk, eggs, nuts, and meat. Gastric digestion is only a stage in the process. Here the foodstuffs are thoroughly mixed, and prepared for the final changes which will take place in the intestine.

The cell workers of the stomach perform their duties with the greatest intelligence.

They do not work haphazardly and blindly. The popular opinion that the stomach works as hard to digest a mouthful as it would to digest a full meal is not founded upon facts. If such were the case, there would be a great waste of energy, which is contrary to a normally working body.

The gastric-juice makers vary the quantity and quality of their product according to the amount and nature of the food eaten. Professor Pawlow says the cells of the stomach possess a sort of instinct. His recently published classic experiments on digestion are more fascinating than a fairy tale. He finds that each separate kind of food corresponds to a definite hourly rate of flow of gastric juice, and that the quality varies to suit the food.

Thus he shows that the greatest digestive power belongs to the juice poured out on bread, but, on the other hand, it possesses very low acidity. Meat requires the greatest acidity, the greatest intensity of gland work, and less juice. On the other hand, it takes longer to digest bread. Bread, which is a representative of the cereals, requires but little hydrochloric acid for its digestion, because of the presence of starch. This is an exceedingly wise and beautiful arrangement, and we see it demonstrated in nature. Acids and starch are rarely combined in ripe foods. Acids and proteids are very seldom found in the same food, and when they are, the proteid is present in a very limited quantity. It is very possible that the reason why bread or cereals cause a digestive fluid of such power is due to the formation of maltose, and this stimulates the nerve endings in the wall of the stomach.

The professor shows that fat in large quantities in the stomach checks the flow of gastric juice, and hinders the digestion of proteid or nitrogenous foods. Hence beans, peas, lentils, and much fat, such as butter, cream, or nuts, is not a good combination. Again, we see this illustrated in nature. Fat is found only very moderately in any of the cereals

The nuts that are rich both in fat and proteid are difficult of digestion for most people. Milk requires a weaker gastric juice and less cell activity than any other foodstuff.

A study of the action of different foods in the stomach, shows that where a certain class of food, rice, for instance, with the Chinese, or fat with the Russian, has long been continued, it develops a certain type of gastric activity, or we might say, the cell workers of the stomach are slaves to a habit. Hence a sudden change of diet is not advisable.

It has long been said that "hunger is the best sauce." Professor Pawlow's investigations already show the truthfulness of this adage. He remarks: "We are therefore justified in saying that the appetite is the first and mightiest exciter of the secretory nerves of the stomach. . . . A good appetite in eating is equivalent from the outset to a vigorous secretion of the strongest juice; where there is no appetite, this juice is also absent." The mechanical stimulation of the surface of the stomach causes practically no flow of gastric juice. Food placed in the stomach during sleep remained for hours without being digested. Digestion carried on under the stimulus of a keen appetite is ten times more rapid than when food is placed in the stomach without the influence of the psychic, or mental, faculty. Food eaten without appetite is worse than a burden. Shakespeare said: —

> "Now good digestion wait on appetite,
> And health on both."

Appetite and good digestion are favored in many ways. It is natural to have a special time to eat, to have a special room, to eat with friends and relatives, to converse. The result is to take the mind, for the time, from all care and trouble, and to concentrate it upon eating. If the mind is distracted by worry, anxiety, excitement, or business cares, there is little desire for food; and it is well there should not be; for the flow of gastric juice is diminished, or checked,

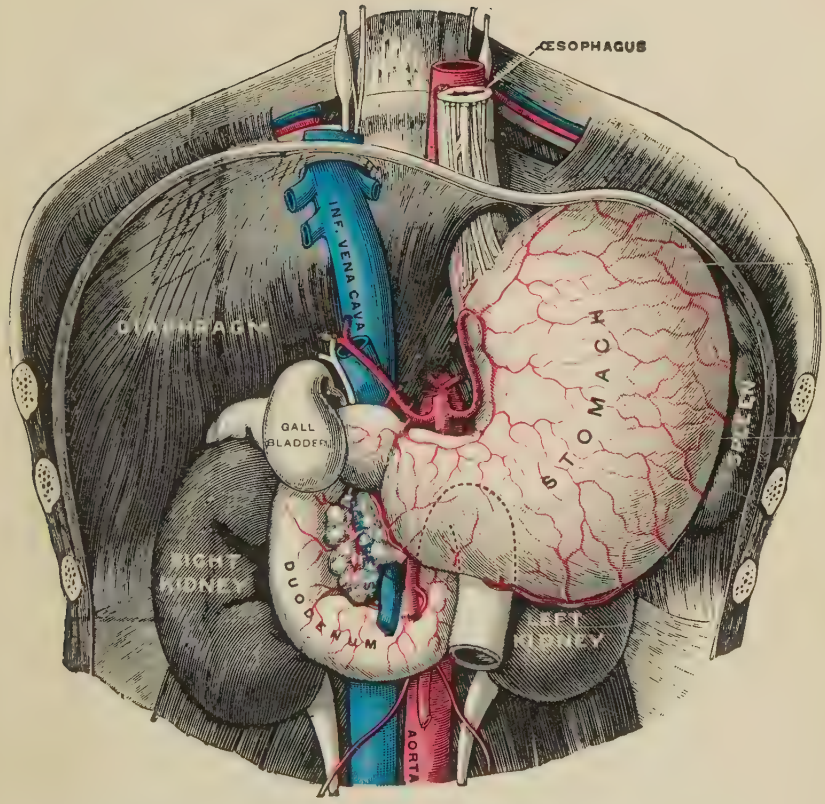


PLATE VII. Stomach and Duodenum

The liver and most of the intestines have been removed, to show relative position of kidneys and stomach

and rendered poor in quality, by this very mental attitude. Meal-time is a time for mental and physical relaxation. Contentment, appreciation, and peace of mind are the best aids to digestion.

After food has undergone a certain preparation in the stomach, it is ready to be passed on into the next department, where the necessary finishing touches are given it preparatory to absorption. Food remains in the stomach from one to several hours. This period of digestion varies according to the digestibility of any particular food, the condition of the stomach, and the mental balance.

As food enters the stomach, and the churning motion begins, the food moves in the direction of the pylorus and back again, and so moves back and forth until it is ready to pass the gatekeeper. Why did it not pass the gatekeeper before? How does the gatekeeper know when food has remained a sufficient time in the stomach? How do the little gastric-juice makers know the different classes of foods that enter the stomach, and so vary the digestive fluid accordingly? These are all interesting questions, and difficult of complete solution. Nevertheless, the body keeps on doing these marvelous things just the same. From the light we already possess, we know that the nervous system presides over these mysterious processes, making use of the intelligence communicated to the nerve-centers from the nerve endings which have received a certain stimulation. The nerve-centers understand perfectly what each stimulation means, and they give orders to the body workers to act accordingly.

The more acid the contents of the stomach, the more slowly the food passes into the intestine, for the acid chyme stimulates the little workers about the gatekeeper, so that the pylorus contracts vigorously, and does not relax for a long time. The less acid in the contents of the stomach, and the more fat present, the more quickly is the food passed

on. This is a very beautiful arrangement, and it reveals divine wisdom in control of all the bodily functions.

THE FINISHING ROOMS

122. The process of digesting food is completed in the small intestine. Digestion is simply the process of changing food into a suitable form for absorption into the blood and the lacteals.

The small intestine is a muscular tube, about twenty feet long, and very closely coiled in the middle portion of the abdominal cavity. It is lined with mucous membrane made up of cell workers peculiar to the needs of this room. The first twelve inches of the small intestine are called the duodenum, from the Latin word for twelve. The most mysterious process of digestion takes place here.

Two very important digestive fluids are poured through little tubes into the duodenum; one is the pancreatic juice, from a gland called the pancreas, or sweetbread; the other is bile, from the liver. The pancreatic juice, which is made to flow vigorously by the acid juice that flows into the stomach, is the opposite of acid; it is alkaline. It helps to digest starch, flesh-building foods, fats, and sugar. Bile is made to flow into the duodenum by the fat in the food, and it joins with other juices in making soap out of fats. Soap is actually formed in the small intestine. In addition to these digestive fluids, cell workers in the wall of the intestine manufacture intestinal juices that act upon all foods.

Saliva acts upon starch, gastric juice upon proteid, but the fluids in the intestine act upon all food elements.

If the food has been hurried through the mouth unchewed and unmixed with saliva, if it has been washed through the stomach by ice-water, or has failed to be acted upon by the gastric juice, no matter whether it be starch, sugar, or fat, the intestinal juices go to work on it at once. If it can be digested, they digest it.

Sugar and sweets have come all the way from the mouth just as they entered it. Neither the saliva nor the gastric juice would have anything to do with them. It is because they are compelled to remain in the stomach so long unchanged that they make so much mischief. When they pass the pylorus, they begin to receive some attention.

The mucous membrane of the small intestine is gathered into transverse folds, called valvulæ conniventes, or winking valves. These, numbering eight or nine hundred, are

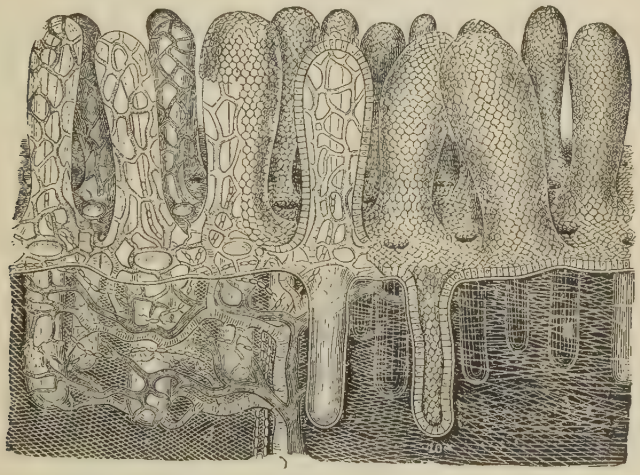


FIG. 48
Suction pumps (villi)

most numerous in the duodenum and the first half of the small intestine. These folds cause the food to move very slowly, about one-half an inch a minute, and present a very large surface for the absorption of digested food.

These winking folds are famous for their structure and for their work. They are made up of millions of little elevations, that give the mucous membrane the appearance of velvet. Each elevation is called a villus, and is about one-twelfth of an inch high. Although so small, each villus contains two arteries, one or two veins, a tiny muscle, and

a little milk-white canal, called a lacteal, from the Latin word for milk. There are more than ten millions of these villi.

When the little muscle of a villus contracts, it turns the villus into a pump, a suction-pump. Ten million suction-pumps at work in your body after each meal, pumping liquid food into the blood! But they work so silently and so smoothly as to give no hint of their existence.

123. This part of the finishing room is full of wonders. Within the villi and between the winking valves fifty millions of hungry mouths, as well as ten million living pumps, are sucking up food from the food canal, passing it on into the blood and into the little milk canals, or lacteals. And these little workers produce a marvelous change in the digested food, even as it passes through the intestinal wall.

A few of the wonderful features of the living manufacturing plant have been touched upon briefly, together with the changes wrought in the crude material food. But, as already stated, food in the mouth or in the stomach or in the intestine is still outside the body, and if it remained there, starvation would be certain.

The process by which digested food is removed from the digestive tract to the blood is called absorption, which means to be sucked up, or soaked up. Absorption begins in the mouth, continues in the stomach, but takes place chiefly in the intestines. The ten million villi and the fifty million hungry mouths do most of this work. All food that is not absorbed becomes waste, and passes out of the body.

All this work, the mystery of the digestion and absorption of food, is carried on by tiny microscopic cell workers. They understand their work, and if it is not well performed, they are not to blame. If we did our work as faithfully as these little cells, if we yielded ourselves to the divine power to be taught as they are, there would be very little sickness in the world.

As food is absorbed from the intestine, it takes two different routes. Most of the fat passes into the lacteals, which begin in the villi. The lacteals belong to the lymphatic system, and carry fat from the intestine to a large reservoir in front of the back-bone, just behind the lower border of the stomach. From this reservoir it is carried through a straight tube up through the trunk cavities to a large vein under the left collar-bone. Here the fat is poured into the venous blood.

Digested proteid, starch, and sugar pass into small veins, which become larger and larger until they come to a very large organ, the liver. After filtering through this, and undergoing other changes, the food passes into the veins again and is carried to the heart, where it joins the fat once more.

A MYSTERY MAN CAN NOT SOLVE

124. As food passes through the intestinal wall, it is changed in some mysterious way, for it is different after it reaches the blood from what it was just before being absorbed. This is one of the Builder's secrets. The food now becomes a part of the stream of life. It is carried by the blood to every cell in the body, to all the living workers, to be used by them as building material. This is what they use for repairing and healing.

The final process is called assimilation, which means the making of food into a part of one's self. How it is done, no man can explain. The wisest physiologist can not with certainty follow this process be-

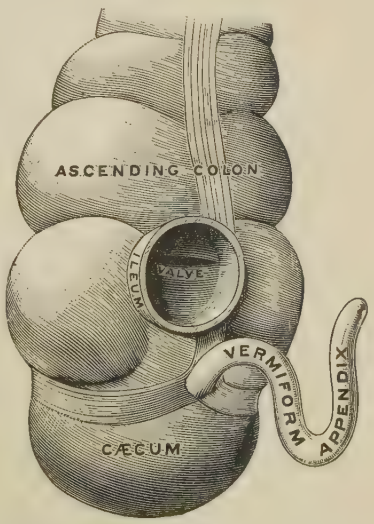


FIG. 49
Diagram illustrating the union of the small intestines with the large

yond the cell. We are all stopped by the mystery of life.

The turning of wheat and corn, milk and butter, fruits and nuts into blood, and the building of blood into living beings that move and see and hear, is more wonderful than the turning of water into wine. This change, however, is so common that little is thought of it, yet it is the constant revelation of the power of God's word working in us.

125. Absorption is completed in the large intestine. This portion of the food canal is about six feet long, larger in diameter than the small intestine, and has larger muscles. The small intestine joins with the cæcum, or blind pouch. This is located low down on the right side. The vermiform appendix is attached to it. From this is the ascending colon, which extends up under the liver, then the transverse colon, then the descending colon on the left side, an S-like bend corresponding to the position of the cæcum, and then the rectum, which is closed by a circular band of muscle, called a sphincter muscle, which forms the anus.



CHAPTER XIII

The Liver

126. This organ stands between man and death every day. If it should cease operations for twenty-four hours, death would be inevitable. Man has been known to live for months after the removal of the stomach, for years after losing several feet of intestine, or one of the kidneys, but he has only one liver, and when it fails, life goes with it.

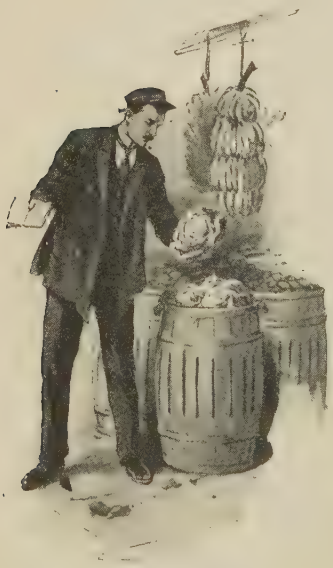
The liver is the largest gland of the body, weighing, in the adult, three and one-half pounds. It is under the ribs on the right side, beneath the diaphragm. It extends to the left, and covers the small end of the stomach, and the lesser curvature, or upper border. It is reddish brown in color, has a smooth surface and sharp edges. The liver has five lobes, separated by five fissures. It is held in place by five ligaments, and is permeated by five sets of vessels. It has at least five different functions.

Like all other glands, the liver is made up of millions and millions of special cells, called liver or hepatic cells, which are about the busiest of all the little workers of the body. The cells of the liver do their work in small groups, called lobules. These lobules are about one twenty-fifth of an inch across, and are separated from one another by very thin partitions of connective tissue. In the center of each

lobule is a vein, called the intralobular vein, which means the veins within the lobules. These veins, in turn, unite to form larger and larger veins, until they combine in three large veins, called hepatic veins, and these carry the blood into a very large vein, that goes to the right side of the heart.

THE GATEWAY OF THE BODY

127. In preceding pages the process of digestion has been traced to the stage of absorption, where the food was left in the vessels, which have their beginning in the suction-pumps, or villi, and in the winking valves. The blood, loaded with living material, is carried into larger veins, until they all unite to form one very large vein, called the vena porta, or the gate, the portal vein; for the ancients in medicine early recognized that this was the gateway to the body. The portal vein enters the liver, and distributes the rich blood to every lobule of this most interesting organ. Then it trickles down between the liver cells of the lobule toward the center, where it is quickly collected into the central vein of the lobule, continuing on its way into the body. As the blood soaks down between the liver cells, which we may call the food inspectors, the food suitable for building is allowed to pass on, while the poisons and waste materials are destroyed, and are carried out through the bile ducts.



A city food inspector

The liver is a faithful porter, receiving food for the needs of the body, and inspecting each portion critically. If city

food inspectors were as careful and as particular as the liver cells are in selecting wholesome food, all would be the healthier for it.

Bile is a yellowish-green fluid that is separated, or excreted, from the blood by the liver cells, and is carried to the gall-sac for keeping, or is poured into the duodenum at the same time that food comes through the pylorus. Bile, while it is a waste product, is formed by the liver cells to aid in the process of digestion. The manufacturer who can find means for utilizing the waste of his factory makes the largest gains. So the body takes a fluid, which would poison it if carried into the general circulation, and uses it in preparing material for repairing and building tissues. Sometimes the bile is absorbed again and again from the intestine, until it becomes dark green, and "bitter as gall." It goes in a small circle, so is kept out of the general circulation. It is charged with poisons, and causes marked mental and physical depression if carried into the blood.

The Greeks connected great depression of spirits with disorders of the liver; hence the term melancholy, which means black bile. There is no doubt that an inactive or overburdened liver has been the cause of many sudden deaths, having produced the desire for self-destruction.

All food absorbed and carried to the liver does not pass at once into the blood. Starch, as such, is not found in the blood. It is absorbed as maltose inverted, and is carried to the liver, where it is again changed into starch, but this time it is called liver starch, or glycogen. Glycogen is stored in the liver, and when it is needed in the body, it is changed again into sugar, and passed on into the blood. The liver is a wise steward, laying up in store for a "rainy day." In the liver, in the muscles, and under the skin there is enough food stored to keep up all the functions of the body for many days; so there is no danger of starving to death in case the evening meal is omitted or forgotten.

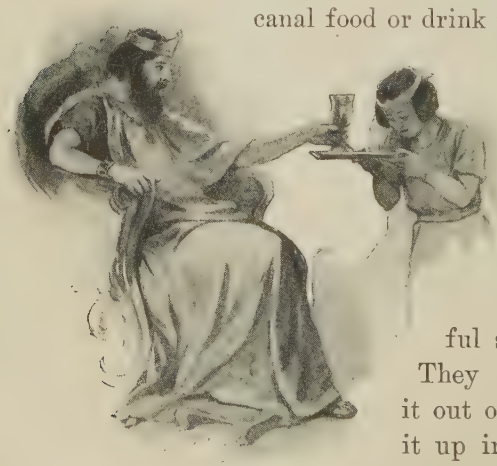
THE STOREHOUSE AND THE STEWARD

128. The liver serves as an important storehouse, where food is held for an emergency. Reserves are kept for the muscles and every organ of the body. The liver acts as a commissariat for the muscles. Every time a muscle contracts, the liver doles out to it a certain amount of liver starch, in the form of sugar. Hence, it is obvious that exercise is absolutely necessary to a healthy, active liver. Imagine the condition of the liver of one who eats freely, but who leads a sedentary life.

The liver is not only a porter, a steward, and a storehouse, but it may be said to be a divining cup, or a skilful chemist on the lookout for poisons.

In olden times certain royal cups, called divining cups, were supposed to have the power of detecting poisons. This was a delusion handed down, and many a king has imbibed deadly poison while drinking from these cups.

The liver cells, however, can not be deceived in regard to poisons, subtle as they may be. These cells are on the alert for every substance that could injure or destroy the body. You may introduce into the food canal food or drink that you know is harmful, but when such foods come to this curious organ, that is alive with food inspectors, it is stopped at once. The liver workers regard every harmful substance as an enemy. They do their best to keep it out of the body, or to break it up into substances less dan-



In olden times certain royal cups

gerous. The man who smokes or chews tobacco is saved from death because these faithful little workers change as much of the nicotin as they can into other substances.

This power of the liver cells to destroy poisons is constantly recognized by physicians. A drug injected under the skin passes directly to the brain and the heart as such, and hence produces a much more rapid and powerful action. The same drug given by mouth is much slower in action, and a large dose is required, for the liver will destroy a certain portion of it. The venom of a snake, that would cause death within a minute if introduced through the skin, is harmless if swallowed, for it must pass the liver, where it is destroyed. In South America the native Indians use a poison on their arrow-heads called *curare,* which will produce almost instant complete paralysis, if shot into the body of a man or an animal. Large doses of *curare* taken by mouth have but little or no effect, for the liver breaks it up. A drug, like food, is only in the body after it has passed this inner door.

129. However, there is a limit to the poison-destroying capacity of the liver. As a rule, the liver cells are greatly overworked. Most people eat more than is necessary; hence these faithful inspectors have more than they can do, and many things slip into the blood without being passed upon. Moreover, the liver becomes tired from constant overwork, gets behind, and finally is completely discouraged. Then comes toxemia, which means poisons in the blood. Some call this biliousness. When the liver workers get behind in their work, there is commotion all through the body.

Eating much candy, sugar, or large quantities of sugar with milk, makes the liver cells fairly groan under their burdens. They become so clogged with blood that they can hardly work. And, what is more, the liver is so gorged with blood that the blood is held back in the stomach, the intestine, and the spleen, causing dyspepsia.

Overeating, and eating for pleasure, simply because things taste good, cause great waste of strength and energy on the part of all the digestive organs. To steal strength from the body in this way is as bad a theft as stealing from your neighbor, and the punishment is just as sure, though it may be delayed.

As all the water taken into the body must pass through the liver, it is evident that free water drinking must exercise a wholesome influence upon this organ. Sir Lander Brunton says it is very doubtful whether gall-stones would ever occur if each individual drank from two to four pints of water daily.

Patients frequently consult physicians in reference to their inactive livers. "Can you not give me something that will make my liver do better work?" is the question often asked. A tired liver is very much like a tired horse. It needs rest. Its burdens should be lightened. Fast a day, or several days, and the liver will take up its duties again with renewed vigor.

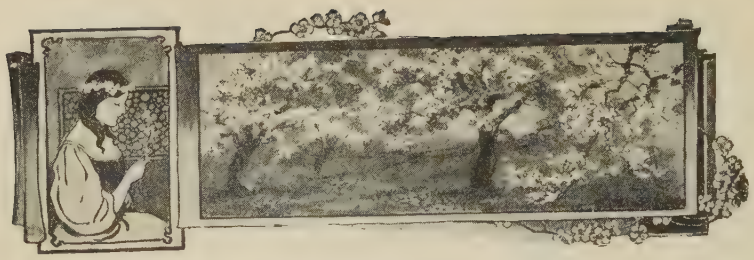
The stomach, the intestines, and the liver are in constant communication with the brain through the avenues of the nerves. As a rule, we think only of the pleasant sensations communicated to the brain over the special nerves of smell, sight, taste, touch, and hearing. While much of our happiness (and unhappiness also, for that matter) is derived from the special-sense organs, yet it is contributed to in no small degree by other sensations. When the vital organs are working normally, they give us sensations of well-being, and these sensations are constantly pouring into the brain. If, however, these organs, and especially the digestive organs, are ill-humored and out of harmony, then opposite sensations pour into the brain, and we wonder why we feel so discouraged and blue, exercise so little faith, and are irritable. We feel then that everything is going to ruin, and life is hardly worth living.

130. The liver workers are also aided by a very mysterious group of workers, called the spleen. The spleen is a gland without an outlet. It is under the ribs to the left of the stomach, and is richly supplied with blood. The spleen is a blood-making organ, and so helps to replenish the stream of life from day to day. It contains some muscle fibers, which cause it to contract about once a minute, thus forcing the blood from the portal vein into the liver.

131. In connection with the liver as a destroyer of poisons, may be mentioned the skin and lungs, both active in removing waste matter.

132. The kidneys are likewise engaged in taking poisons and waste matter from the blood, and throwing it off in the urine. The kidneys are two large bodies located in the loin on either side of the spinal column. Running from the kidney to the bladder is a little tube called the ureter. In the course of twenty-four hours the kidneys throw out of the body from thirty to fifty ounces of waste. If both kidneys were inactive for two days, death would result. While the kidneys are frequently diseased, it is true that they very seldom give rise to any pain, especially in the back. Quacks attribute most pain in the back to disease of these organs, causing great alarm, and hence opening the way for their filthy nostrums.

Gall-stones and stones of the kidneys and many diseased conditions may largely be prevented by free water drinking, avoiding alcohol, tobacco, and meat in excess.



CHAPTER XIV

Foods

PURPOSE OF FOOD

133. Food is necessary to the life of every living thing, from man down to the most minute form of animal or plant life. Food and life are almost inseparable terms in this connection, for life is impossible without food of some nature.

The human living machine is an engine of the highest order. It is a low-pressure engine, and works with a smaller loss of energy than does any machine invented by man. As fuel and steam are necessary to run an engine, so food is necessary to maintain the living machine perfect in all its parts. It has been said that a machine is a piece of apparatus so designed that it can change one kind of energy into another for a definite purpose. Energy is the power to perform work. Food contains energy in a potential or passive form, which must be changed into other forms of energy before it can do work. The living machine takes food and transforms this potential energy into vital energy, which, in the body, is manifested in the form of heat, work, and vitality.



Fuel and steam are necessary to run an engine

The conversion of the potential energy of wheat, corn, nuts, and fruits into vital energy is a change which we may trace for a

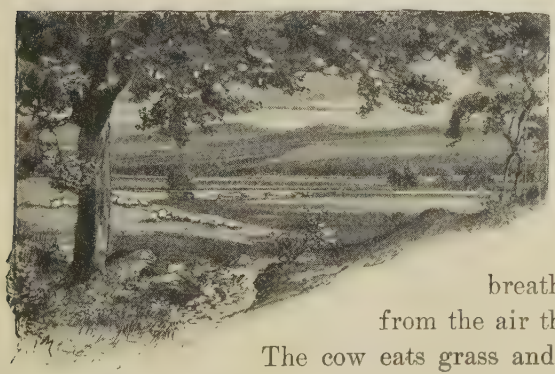
time as a chemical process, but, though the perception of one may penetrate into this secret farther than another, yet, to all alike, the horizon drops, and beyond is still the great mystery of life.

Energy is the power to work. So far as we know, this power comes from the food we eat, the water we drink, and the air we breathe. Every thought, every emotion, every heart-beat, every movement of a muscle, is food energy transformed into thought and action. In cold weather a large portion of the potential energy of food is changed into heat. As each cell works, it gives off waste material, just as the burning of fire leaves ashes.

So we may say that food serves at least three purposes in the body; namely, to supply material for repairing and healing the tissues, to supply energy to enable each part to perform its functions, and to supply heat to maintain a proper temperature.

THE SOURCE OF FOOD

134. The earth is the primary source of food. Plants and animals, as well as man, obtain their food from the earth. Job declares: "As for the earth, out of it cometh bread." In the psalms we read: "He causeth the grass to grow for the cattle, and herb for the service of man: that he may bring forth food out of the earth."



"He causeth the grass to grow"

The rose-bush takes up food from the soil through its roots, and breathes in oxygen from the air through its leaves. The cow eats grass and clover from the

meadow, drinks water from the brook, breathes the same air that we do, and in her body the grass, the water, and the air are turned into bone and blood and muscle. We eat grains and vegetables and fruits, drink water, and breathe air, and in our bodies, also, these raw materials are turned into bone and blood and muscle.



The cow eats grass and clover from the meadow, drinks water from the brook

It seems to us a marvel that iron and wood and other materials can be taken from the earth, and so changed that out of them are fashioned strings and keys and all the delicate parts of a beautiful piano.

It is, indeed, a marvel that out of gold and silver, gems and metals, crude materials from the earth, can be made a watch, a Corliss engine, a telescope, or a microscope.

Though these transformations are astounding, yet they pale into insignificance when compared with the silent, unseen changing of food and drink, wheat and corn and fruits and nuts, into living cells, into bone and blood and brain, into working and thinking men and women.

NATURE'S GREAT LABORATORY

135. In the laboratory of the soil there are taking place the most mysterious processes, manifested to us in the form of vegetable life.

The vegetable kingdom is the secondary source of food, and it supplies the greater portion of the animal kingdom directly with food. Animals are the tertiary source of food. The plant is the food builder for the animal kingdom, and the animal is the food consumer. The plant builds up and unites elements into complex substances. The animal breaks

down this complex substance, or molecule, and builds it into other complex forms, but in doing so there is a tearing down or disintegrating process going on. For this reason the animal was not intended as the primary source of food for man. It was permitted to be used only after sin entered the world. No natural food contains, as part of its own organism, waste matter, or elements of disintegration.

In plants, or the food makers, are found the primary foodstuffs, such as proteid, starch, fat, and salts, repeated over and over again in many kinds of foods, but in different proportions. This should be a principle to enable us to select the proper food combinations for each meal. The food elements required by the body are few in number, but arranged in a very large variety of combinations, and these, together with the peculiar flavor of each, furnish man with all the change needed. The five or six food principles in their various combinations supply all that is of physiological importance in the economy of life.

The individual flavors of foods probably possess no food value; they can not be analyzed, and, doubtless, are provided for the purpose of stimulating the appetite and satisfying the peculiarities of taste. They lead to the selection of certain foods suitable to the needs of the body under different conditions. It is in this selection that the natural instincts and intuition play so important a rôle. In fact, if the senses have not been perverted, it is marvelous to see how the taste for certain food elements will vary from time to time to suit the needs of the body. At cer-



Crude materials from the earth

tain times there is a desire for acids, then again for sweets, or salt, or fat, or proteid foods, or starch foods. As a rule, it is safe and best to follow this natural craving, as it very seldom leads to harm. In certain parts of Africa, where the vegetables and fruits seem to be deficient in salt, it is said that the natives go long distances for this element, and will exchange gold for it, weight for weight. This is only an instance showing how the cell workers of the body know their own needs. If something is lacking, a message is sent to headquarters, the brain, and we feel that a certain food would be good for us. It is well known that when foods are naturally rich in salt and other minerals, there is little desire for these elements under normal conditions.

In animals and insects, where natural instinct rules, and the senses are not perverted, this natural selection of food is very prominent. It is very seldom that these creatures eat anything of a poisonous or harmful nature.

We form the habit of eating certain foods. Moreover, the cell workers of the stomach and other portions of the digestive tract form the habit of producing a special quality of juices, because a certain food has formed a fixed portion of the diet for months and even years. For this reason, a sudden, complete change of the diet is likely to cause commotion for a time, until the digestive organs can adjust themselves to the new conditions. The Chinese coolies may live largely upon rice, and the Laplander upon fat, and still both maintain a comparatively good degree of health. Both, however, maintain principally an animal existence, with but little mental action. The active mental races could not long sustain their mental superiority and live exclusively upon the one or the other of these foodstuffs.

The more active the mind and body, the more varied are the tastes from day to day. The mental state is influenced daily by sunshine, by cloudiness, by barometric pressure, by rest, sleep, exercise, and the mental attitude of others.

With tastes long perverted, all these variations are likely to give rise to longings for foods and drinks that tend to pauperize an already exhausted nervous system. Abused organs and senses convey morbid sensations to the brain, which are interpreted by the feelings, and gratified accordingly.

It is obvious, therefore, that the nearer one lives to nature, the more truly will all the needs of the body be met. Instead of sitting down to breakfast on a hot, close morning and eating heartily of highly nitrogenous foods, there will be a desire for fruits and a light diet. This will aid one in keeping cool. On the other hand, on a cold day, and when exposed to cold, there is a natural desire for the heat-producing food. He is a happy individual who wisely interprets his sensations and knows when to say, No, and has the strength to obey his decision.

CLASSIFICATION OF FOODS

136. All the foods that we eat may be divided into two great classes — nitrogenous foods and carbonaceous foods.

Nitrogenous foods are foods that contain nitrogen. There can be no life without nitrogen. Four-fifths of the air is nitrogen, but it passes in and out of the lungs without being used. It simply dilutes the air. But nature puts nitrogen into plants, which are built into bone and flesh. There can be no growth without nitrogen. It is necessary in order to carry on the process of repair and healing in the body. Worn-out brain-cells, bone-cells, and wasted muscle-cells that need repairing are all restored by nitrogenous foods. These are found in wheat, barley, oats, corn, potatoes, peas, beans, lentils, meats, milk, cheese, and nuts.

137. Milk is a nitrogenous or flesh-building food. It contains all the elements of a perfect food. It is the only food that a body less than a year old needs. All young animals live upon milk until they are old enough to find their own food. Milk is a good food for most children, and is used

largely by grown people, but the continuous use of milk disagrees with many who are suffering from some form of dyspepsia, and dilation or prolapsus of the stomach. As soon as milk causes a coated tongue, it should be discontinued. Milk contains albumen, fat, sugar, ash, and water in such proportions as to make it a nourishing food. The one principal objection to the use of milk to-day is the fact that a large percentage of cattle have tuberculosis. Milk from animals suffering from tuberculosis contains a poison that makes the body susceptible to this disease.



Milk contains all the elements of a perfect food

138. Eggs are also flesh-building foods. Birds and chickens growing in the egg live on the meat in the egg until they are hatched. If eggs are fresh, they are very wholesome and nourishing. The white of the egg is pure albumen, and the yolk contains a large percentage of proteid. The yolk also contains a large percentage of fat, some sulphur and nitrogen, and a little iron. Eggs are most digestible when taken raw or beaten into egg-nog. Hard-boiled and fried eggs are very indigestible. Eggs are best cooked when put in cold water and brought to the boiling-point. Or throw them into boiling water, remove to the back of the stove, and allow to stand ten minutes.

The average egg weighs about two ounces. It contains about fifteen per cent proteid, and thirty-three per cent fat. The older the egg is the lighter the yolk becomes. An egg a day old will sink nearly to the bottom of a salt solution containing four tablespoonfuls of salt to a pint of water; one a week old will float on the surface.

Eggs are stimulating to the sexual organs of some individ-

uals. They should not be given to fever patients. The white of the egg should not be given in intestinal catarrh.

139. Animals used as food live on food grown from the soil, just as man does. It is true that their flesh does contain nitrogen and other food elements, but these are badly mixed in with the poisons and waste that are to be found in any living body. There are little breathing, moving, working cells in the cow's body and the chicken's body, just as there are in man's, and they throw off poisons and waste matter, like any other cells.

Animal food consists of muscle, fat, arteries, veins, and nerves, and blood in varying degree. Meat that is eaten immediately after the animal is killed is tender. If it is eaten during death-stiffening, or rigor mortis, it is tough. After this passes off, the meat begins to decompose, which makes it tender again. When meat is "well hung" it is understood to be tender from long hanging, hence in varying stages of decomposition. The flesh of young animals is very indigestible and unwholesome.

Parkes gives the following characteristics of good meat: "The flesh should be firm, elastic, of a bright uniform color; in fresh meat the outside is lighter in color than the inside, owing to oxidation of the hemoglobin in the blood. Lean meat is paler than blood, so that a dark purple color shows that the blood has not been properly drained away, and fresh meat placed on a plate should always part with a slight amount of reddish juice. The flesh of young animals is always paler than that of mature animals. The muscle should be fine-grained, and have a slightly pleasant odor, becoming savory when heated; the flesh should present a marbled appearance, owing to an admixture of fat with the muscular fibers. On cutting, the interior should show no softening of the connective tissue, as this indicates the commencement of decay. The 'knife blade' test is easily applied: push a clean knife blade to the bone, and any internal softening will

be detected by lessened resistance, and the smell of the blade will reveal decay."

Beef is the most nutritious of all flesh foods, and it is used most extensively. The best beef contains about twenty to twenty-two parts proteid, six parts fat, and seventy-two parts water.

140. All meats contain much waste matter that was on its way to the eliminative organs when the animal was killed. In animals poorly bled, the waste is much more abundant. In flesh-meats are found such waste and poisonous substances as kreatin, kreatinin, and uric acid, which have a stimulating influence on the body when eaten. For this reason flesh foods are especially harmful to children.

Meat is often diseased. Whether diseased or not, if eaten in large quantities year after year, it is sure to make mischief in the body. It brings on disease of the lungs, the stomach, the liver, the kidneys, and is often a direct cause of rheumatism.

The excessive consumption of meat in this and other countries, can no longer be ignored as a prominent factor in causing disease. Cancer during the past thirty years has increased at an appalling rate among the more civilized nations, while it is reported to be quite infrequent among uncivilized tribes, as well as among nations of primitive habits. Investigations show that the occurrence of cancer is comparatively rare in hot climates and among people who live largely upon starch food or cereals and fruits. A highly nitrogenous diet is unquestionably a cause of the rapid increase of this disease.

The average American would be greatly benefited if he restricted his meat diet, and in its place substituted other more wholesome foods. The continual increase in the price of meats has not been an unmitigated evil. It has convinced many who formerly used large quantities of flesh foods that they could live very well without them, and at a

less cost. Again, many have found that they felt much better on a simpler diet.

The original diet for man and animals is set forth in these words: "And God said, Behold, I have given you every herb bearing seed, which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat."

Plants are the natural food makers. No life need be taken to obtain food for them. In fact, it is the life in them that provides food. Life makes them grow from seed to plant, from plant to fruit, from fruit to seed. Life so abounds in the whole plant world that there is food enough for all, for plants and animals and men. It is living food, of the purest quality.

In making every pound of food manufactured by plants, from two hundred to three hundred pounds of water are used. The water is sucked in from the soil by the little roots, and lifted into the leaves and branches. Sunshine and air are also used, so that when we eat plant foods we are taking into our bodies stored sunlight, oxygen, nitrogen, and pure, distilled water.

No man could put these things into food. No man could invent or make a food. The manufacturing power is revealed through the life of the plant, and no man knows the secret of life.

There is abounding life in grains and nuts and fruits even when they are cooked. These foods contain no poisons. Meat is a second-hand food, at the very best. The wheat, the corn, the vegetables, the albumen, the nitrogen, the fat in the meat, had all been



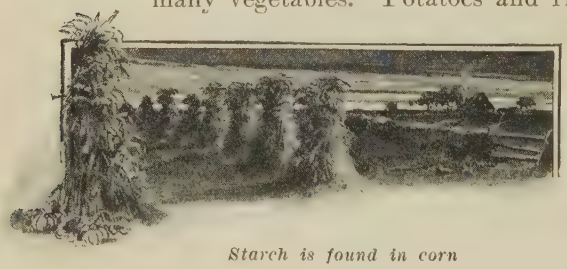
Life makes them grow from seed to plant

obtained by the animal from plants. As second-hand clothes and second-hand furniture are neither so clean nor so durable as clothes and furniture fresh from the makers, so with second-hand foods.

Carbonaceous foods are the foods that contain fuel to be used in the body, to keep it warm. "Carbonaceous" means "containing carbon." It is the carbon that burns in coal and wood. It is the carbon that burns in food.

Carbonaceous foods contain starch, sugar, or fat. Most of these are furnished by the vegetable kingdom.

Starch is found in rice, potatoes, wheat, oats, rye, barley, corn, tapioca, in many nuts, particularly the chestnut, and in many vegetables. Potatoes and rice are used more than any other starchy foods.



Starch is found in corn

So it will be seen that in both of the great classes of foods the plant foods predominate, and, furthermore, that they contain all the elements of nutrition necessary to sustain and keep the body in health. All vegetable foods are poor in fat, with the exception of nuts and olives. Oats contain about six per cent of fat; corn contains four and seventy-six hundredths per cent of fat; barley, two and twelve-hundredths per cent; and wheat and rye, each one and seven-tenths per cent; rice has less than one per cent, and millet has as high as five per cent. Plant foods contain from one to twenty-seven per cent of proteid. Starch is a predominating element in most of them, and they are rich in mineral salts, especially potassium, sodium salts, and phosphates. In addition, considerable iron is found in wheat, strawberries, and tomatoes.

141. The seeds, roots, or stems of plants furnish food for man. The seed foods are divided into two classes, the cereals, or grains, and the leguminous, or pulse foods. The cereals were named after the goddess Ceres, the god of corn, which comprises all grains. Cereals can be found in all parts of the globe between the Arctic circles. Wheat, barley, rye, peas, beans, and lentils are of great antiquity.

142. Wheat stands at the head of cereals as a food and in its utility. The nutritive value of wheat or any other cereal



Wheat stands at the head of cereals

depends upon the soil in which it grows. Some Russian wheat contains as high as twenty-one and five-tenths per cent nitrogenous matter.

The outer coat of the wheat is made up of cellulose, and is indigestible. In the process of milling this is removed, and we call it bran. Directly under this coat is the most nutritious portion of the grain, namely, gluten. This is the gummy or sticky part that remains after the starch has been washed out. Wheat contains more gluten than any other grain, and it is due to this that it is superior for bread making. Rye comes next in the quantity of gluten. Oats and corn are lacking in gluten, and hence can not be used for making raised bread. Whole-wheat flour contains a greater percentage of nutritious elements than does fine white flour. Excessive grinding removes part of the gluten, fat, and salts.

143. The following table by Knight gives the comparative composition of various cereals: —

Grain	Proteid	Fat	Digestible Carbo-hydrates	Cellu-lose	Ash	Water
Wheat	12.42	1.70	67.69	2.66	1.79	13.56
Rye	11.43	1.71	67.83	2.01	1.77	15.26
Barley	11.16	2.12	65.51	4.80	2.63	13.78
Oats	11.73	6.04	55 43	10.83	3.05	12.72
Maize (corn)	10.05	4.76	66.78	2 84	1.69	13.88
Rice	7 81	0.69	76.40	0.78	1.09	13.23
Millet	11.3	5.6	67.3		2.03	12.3
Buckwheat	9.28	1.89	70.68		0.86	14.27
Wheat flour	8.91	1.11	74.28	0.33	0.51	14.86
Wheat, coarse	11.27	1.22	73.65	0.84	0.84	12.18
Rye, fine	10.21	1.64	73.64	0.64	0.98	13.99
Rye, coarse	11.06	2.09	67.85	2.61	1.69	14.77
Barley meal	10.89	1.23	71.85	0.47	0.63	14 83
Pearl-barley	7.25	1.15	76.19	1.36	1.23	12.82
Oatmeal	14.29	6.56	65.73	2.24	2.02	10.07
Corn-meal	14.0	3.80	70.68		0.86	10.60
Ground rice	7.43	0.89	77.62			14.15

144. Oats are rich in nitrogenous matter and fat, as will be seen by the table given. They contain avenin, a substance that resembles gluten on the addition of water. For this reason bread can not be made from oat flour. The albumen found in oats is very stimulating. Doubtless this has something to do with making a horse "feel his oats." Eating oats will make even a hog frisky. Oats are also rich in sulphur, phosphates, magnesia, and lime, hence are excellent food for repairing the living body. Grits are made from oats after the hull has been removed. Oatmeal in water makes a very refreshing drink in hot weather. Oats possess another valuable property, and that is the laxative action when eaten freely. Oatmeal gruel and oatmeal jelly are excellent food in fevers, and in gastric or bowel troubles. Oats prepared in any form should be cooked for several hours.

Oats and corn are heat-producing food, and are of great importance in cold weather. The temperature of the body

must be kept at 98.6°, summer and winter, whether one lives in the cold north or at the equator. In winter a great deal of heat is being given off from the skin and lungs, about as heat is given off from a stove or a hot coil. If clothes were not worn in cold weather, the loss of heat would be so great that many would perish.

Thus it is essential that we eat more in winter than in summer. We need more heat-producing foods, like fat and starch. These give off much heat, and set free much energy, so we can keep warm and active. Many make a mistake in not eating enough fat in cold weather. Fat is necessary to good repair. An adult requires about one and one-half ounces of fat in twenty-four hours, four ounces of proteid, and from fifteen to twenty ounces of carbohydrates or starch food. Less is required if food is very thoroughly masticated.

145. Nuts are rich in fats, in a form that is easily absorbed. Fat is also present in ripe olives, in milk, butter, cheese, eggs, and meat.

146. The leguminous or food-bearing plants are richer in nitrogenous elements than is any other food. They are rich in proteid, potash, lime, sulphur, and phosphorus. In this class of foods stand peas, beans, and lentils. The following table from Bauer shows the high nutritive value of these foods: —

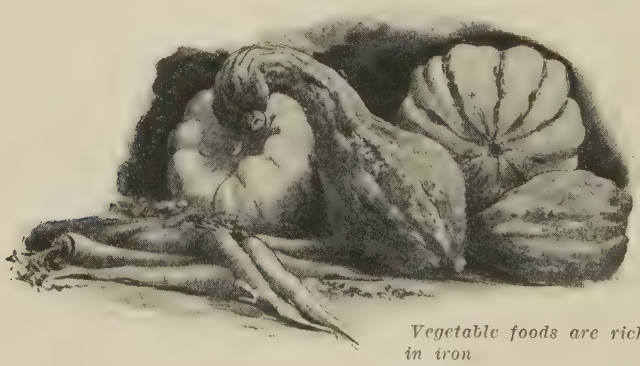
Legumes	Water	Proteid	Fat	Starch, etc.	Cellulose	Ash
Peas	14.31	22.63	1.72	53.24	5.45	2.65
Beans	13.60	22.12	2.28	53.63	3.84	3.53
Lentils	12.51	24.81	1.85	54.78	3.58	2.47
Wheat	13.56	12.42	1.70	67.89	2.66	1.79

The legumes are covered by an exceedingly leathery hull, that is indigestible. For this reason if the hull is not removed, the food should be soaked in cold water for several hours, and very thoroughly cooked. While the legumes contain a high percentage of proteid, a large percentage passes through the intestine unabsorbed. Therefore,

hulled beans are more digestible, and peas and lentils should be put through a colander, or made into purée.

Lentils are the most nutritious of these foods. The haricot, or French bean, possesses about the same nutritive value.

Potatoes form a staple article of diet. They contain twenty per cent of starch, which is the most easily digested of any form of starch. It is well to remember, however, that the potato contains less starch than rice, peas, beans, or lentils. The potato is poor in nitrogenous elements, and so must be combined with nitrogenous food to make a well-balanced diet. Fat and starch are more easily digested to-



Vegetable foods are rich in iron

gether than are fat and proteid. Potatoes should be baked or boiled.

The most nutritious portion of the potato is directly under the skin. Sweet potatoes, yams, arrowroot, tapioca, and sago are all in this group as regards composition.

147. The tomato, though belonging to the fruit class of foods, is used as a vegetable. It can be prepared in a large variety of ways, and serves as an important article for flavoring and as a relish. The sour taste of the tomato is due to the presence of oxalic acid. The tomato is also said to contain iron, and hence is an excellent food for one who has impoverished blood.

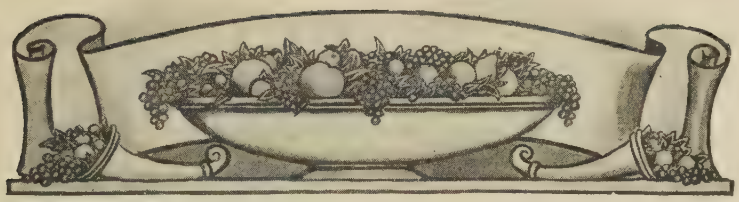
148. That vegetable foods are rich in iron is very forcibly demonstrated by the following figures, which are taken from Professor Bunge's classical work on "Physiological and Pathological Chemistry": —

The number of milligrams of organic iron (1.0154 grains) contained in 100 grams (3 1/3 oz.) of the following food substances in a dry state: —

White of hen's egg	Trace
Rice	1.0– 2.0
Pearl-barley	1.4– 1.5
Wheat flour (sifted)	1.6
Cow's milk	2.3
Human milk	2.3– 3.1
Figs	3.7
Raspberries	3.9
Hazelnuts (kernel only)	4.3
Cabbage (inside yellow leaves)	4.5
Rye	4.9
Almonds (peeled)	4.9
Wheat	5.5
Bilberries	4.7
Potatoes	6.4
Peas	6.2– 6.6
Cherries (black, without stones)	7.2
Beans (white)	8.3
Wheat bran	8.8
Strawberries	8.6– 9.3
Linseed	9.5
Almonds (brown skins)	9.5
Cherries (red, without stones)	10.0
Hazelnuts (brown skins)	13.0
Apples	13.0
Cabbage (outer green leaves)	17.0
Beef	17.0
Asparagus	20.0
Yolk of egg	10.0–24.0
Spinach	33.0–39.0
Carrots	8.6
Dandelion leaves	14.0

The table below shows the weight of various foodstuffs, in the form in which ordinarily taken, required to furnish ten milligrams, or 1/6 grain, of iron, the amount required by an adult per day: —

Rice	2.3 lbs.
Pearl-barley	1.7 lbs.
Wheat flour (sifted)	1.6 lbs.
Cow's milk	1.0 gal.
Human milk	6.5 pts.
Figs	2.2 lbs.
Raspberries	3.4 lbs.
Hazelnuts (kernel only)	9.0 oz.
Barley	11.5 oz.
Cabbage (inside yellow leaves)	5.2 lbs.
Rye	5.4 oz.
Almonds (peeled)	7.5 oz.
Wheat	7.8 oz.
Potatoes	1.5 lbs.
Cherries (black, without stones)	1.6 lbs.
Beans (white)	5.2 oz.
Carrots	3.0 lbs.
Strawberries	2.2 lbs.
Almonds (brown skins)	4.8 oz.
Cherries (red, without stones)	1.1 lbs.
Hazelnuts (brown skins)	2.3 oz.
Apples	1.2 lbs.
Cabbage (outer green leaves)	1.2 lbs.
Beef	9.0 oz.
Asparagus	2.0 lbs.
Yolk of egg	4.0 oz.
Spinach	11.0 oz.



CHAPTER XV

Foods (Continued)

FRUITS AND NUTS

149. Fruits and nuts are the gold and silver in pillar, wall, and fretwork in the building of this wonderful and marvelous palace in which we live. Cereals and the more solid vegetables may be said to be the solid timbers.

"Man has been asserted to be naturally a frugivorous animal, who by habit has become omnivorous; and it is certain that, taking the word in its botanical sense, fruit exceeds in human value all the other parts of plants. In cereals they are valued for their farinaceous matters, starch, fat, and gluten; in succulent fruits, for their water, sugar, for acids, and salts; in the banana, plantain, and breadfruit, for their starchy pulp; in nuts, for their oils."

The great Architect is an artist as well as a builder. Every food intended to be used in building the body, is itself, in its natural state, beautiful and fair to see. Examine a kernel of wheat or corn, and notice the fineness and daintiness of it. Think of the rosy apple, the yellow pear, the purple plum, the downy peach, the transparent grape — every one of all the different kinds of fruit has a color and a shape of its own, and every one is beautiful.

Not only this, but every fruit has a different flavor, or taste. It would be hard to find a person who did not like

some kind of fruit. When one is sick and has lost his appetite, fruit is often the only thing desired. Nature makes one crave the food that will be best for the cell workers to restore the health and give an appetite.

Every season has its own peculiar fruits. From June to June one delicious variety follows another. When the strawberry comes, we think it has the finest flavor possible. But soon there are raspberries, blackberries, cherries, early apples, each and all pleasing different tastes. When cherries are gone, there are blueberries, huckleberries, plums; a little later, peaches, apples, grapes, watermelons. All through the autumn many varieties of apples, grapes, and peaches ripen and are harvested. The apples last all winter, and there is no better fruit. Grapes also are in the market at every season. From December to April we get the best oranges, lemons, and bananas. Bananas, too, last all the year round. Dates, figs, and prunes are so prepared that we can have them at any time. Cranberries are on hand for Thanksgiving, Christmas, and New Year's day. What a feast of fruits!



What a feast!

Most fruits are nearly all water. The water of each fruit has a distinctive flavor and color. Fruit juice is the purest and most refreshing water to be found. It has been distilled by the mysterious power that is at work in all living things.

Besides water, fruits contain acid and sugar. Even the sweetest fruit has some acid. Lemons, limes, and some oranges are very acid.

A fruit may be both sweet and acid. The sweetness is

due to the presence of grape-sugar or fruit-sugar. When a fruit is ripe, it usually contains more sugar than acid. Adding sugar to fruit juice does not change the acid. You may put sugar into lemon-juice until it makes a sirup, but the acid remains unaltered.

There are natural sugars, called grape-sugar and fruit-sugar, in varying quantities in all fruits. Some contain a large percentage of sugar. Sugar is also found in honey, in milk, in sugar-cane, and in sugar-beets.

The best quality of sugar is furnished by fruits and fruit juices. Green fruits contain starch but no sugar. In the process of ripening, the sun converts the starch into fruit-sugar. When fruit-sugar is oxidized in the body, it gives energy to the muscles. So fruits act as a muscle tonic. But fruits do not produce as much heat and energy as the starchy foods or fats, hence they are the most refreshing foods in hot weather or at any time if one has a fever.

Lemon-juice is sometimes used in cleaning brass. The acids of fruits are cleansing to the mouth, the stomach, and the intestines. Many of the fresh fruit juices are destructive to germ life. Typhoid fever germs are slowly killed by lemon-juice. Living exclusively on fruits for a day or two is an excellent way to cleanse and disinfect the alimentary canal as much as it can be. This method is superior to the use of drugs. Fruit juices are cooling to the blood, and they help the kidneys to throw poisons out of the body. The lemon and the grapefruit have a most excellent action on the liver, superior to that of calomel or other drugs that are supposed to act on the liver, and no poisonous effect remains. In malarial fever no fruit is so beneficial as the lemon and the grapefruit. Hence it is clearly to be seen that the acids of fruit serve a very important purpose in keeping the body in health.

Such fruits as bananas, dates, figs, and raisins, are very nourishing. The banana contains a larger percentage of

nutritive elements than does meat. In its composition are found acids, salts, and water; four and eight-tenths parts albumen; six, fat; seven, sugar. When baked, it is very digestible.

150. Dates contain as high as fifty-eight per cent of sugar, and figs are also rich in sugar. Dates and figs are laxative. This property is probably due to the seeds they contain, more than to any other factor. Both fruits are wholesome and very nourishing.

151. Grapes are among the most luscious of all the fruits known to man. They contain more sugar than does any other fruit, with the exception of dates. One and one-half pounds of good grapes equal in food value one egg. Tartaric acid is present in grapes, and is combined with potash and lime. The ratio of sugar to acid is twenty-nine to one in grapes of good quality.

The "grape-cure" consists in eating from one to four pounds of grapes a day, beginning with a half pound and gradually increasing the amount. This is taken for constipation and dyspepsia and tuberculosis — often with excellent results.



Grapes are among the most luscious of all fruits

152. Apples are among the best of the fruits, and in this country are used very extensively. There are over eleven hundred varieties. They are rich in sugar, and the firmness of the fruit is due to the large amount of cellulose present. Apples are laxative, due to the malic acid present. They are rich in a sub-

stance called pectin, hence are excellent for making jelly. Baked or boiled apples are sweeter than raw apples, and more digestible. Baked sweet apples are better for those who have an excess of hydrochloric acid in the stomach. Baked apples are less likely than others to cause a burning sensation in the stomach. A diet of apples and zwieback will, in many cases, clear up a badly coated tongue and relieve constipation. Apples should not be eaten after a hearty meal. Pears are less acid than apples and less serviceable. They also contain malic acid.

153. Oranges, lemons, grapefruit, and limes are classed together. All contain citric acid. The sour oranges contain more acids than do the sweet ones. The white portion of the orange is mostly cellulose, and so this part should never be eaten.

154. Lemons are much more acid than oranges, containing from seven to eight per cent of citric acid, combined with a small amount of malic acid. The value of lemon-juice made into a drink has long been known, but it is often more than neutralized by the excess of sugar used. The juice of half a lemon or half a grapefruit taken one-half hour before meals is excellent to prepare the stomach for the coming meal, and is a splendid appetizer. The lemon is especially useful in fevers and in rheumatism.

155. Strawberries are about the first of the fresh fruits that come to gladden the heart of man. It has been said that "the strawberry is one unalloyed and unimpaired mouthful of deliciousness; it has neither rind nor stone to mar the perfect pleasure of the palate, and it is so healthful that you can eat it till you are tired."

It contains from two to eight per cent of sugar, and is rich in all the mineral salts usually found in fruits; it also contains iron. It is said that strawberries are rich in soda, and hence to be recommended for gout. In a wet season, they are soft, lacking in sugar, and are insipid.

Those who refrain from eating them for fear of rheumatism, surely are practising great self-denial, and that uselessly, for the soda salts of strawberries and other fruits neutralize the acids present in rheumatism.

Other wholesome and excellent fruits in their season are peaches, whortleberries, raspberries, blackberries, and cranberries. Blackberry juice, huckleberry juice, and black raspberry juice are astringent, and of great service in looseness of the bowels. These juices are also very acceptable in fevers.



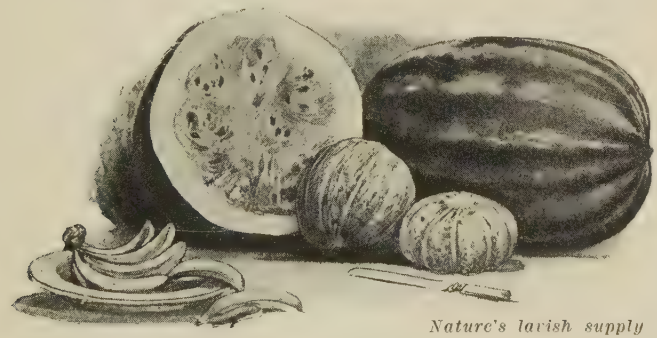
Nature is lavish in supplying mankind

156. Very acid fruits should not be eaten with meat, milk, eggs, or starchy vegetables. It is better to make a meal almost entirely of fruit than to make food combinations that are not represented in nature. Nature does not combine starch and acids, nor acids and fat, nor acids and nitrogenous elements, to any large extent. The banana may be a slight exception to these rules. Unless eaten half an hour before meals, it is better to eat fruits at the close of the meal, for the acid of fruits stops digestion of starch in the stomach, unless both the starch and the fruit are very thoroughly masticated.

157. Many people seem to be of the opinion that fruits are not good for them, and that they can not digest them. As a rule, there is a cause for this. Many do not eat fruit without using some sugar, especially stewed and canned fruit.

Cane-sugar, when used in large quantities, causes the fruit juice to ferment, or sour, in the stomach, and then it makes trouble. Again, fruit is eaten after a hearty meal of meat, potatoes, eggs, salads, and preserves, and it does not combine well with these.

The process of canning fruit now enables us to have fruit the year round. The first canned fruit was put up by nature. The best housekeeper that ever lived can not approach mother nature in the matter of canning fruit. Every ripe apple, or plum, or peach, or grape, or cherry is a perfect little can



Nature's lavish supply

of fruit, closed and sealed, air-tight and waterproof, each labeled with its own color. An orchard or a vineyard is a wonderful storehouse of canned fruit.

The fact that nature has been so lavish in supplying mankind with such a variety of fruits is a strong indication that man was intended to eat largely of fruit. Most of the fruits are not eaten so much as tissue builders as they are for their beneficial action upon all the organs of the body, and because they supply it with minerals and acids that can not be obtained in any other way. Scurvy is an unknown disease where fruits are eaten. It is generally thought that as fruits are nearly all water, they possess little value as a food, but a comparison of the following figures will show the food value of fruits per pound represented in heat calories

as compared with milk. These figures are taken from the bulletin of the United States Department of Agriculture. In each case the average figures are given.

FOOD VALUE OF A POUND OF FRUIT

	Calories, per lb.
Milk	325
Olives, ripe	1,205
Bananas	460
Grapes	450
Plums	395
Persimmons	630
Pomegranates	460
Prunes	370
Whortleberries	390
Apricots	270
Blackberries	270
Cherries	365
Cranberries	215
Figs	380
Huckleberries	345
Lemons	205
Muskmelons	185
Watermelons	140
Nectarines	305
Oranges	240
Pears	295
Raspberries	310
Raspberry juice	935
Strawberries	180

From the above figures it is seen that many of the fresh fruits possess a greater food value than does milk. Dried fruits have a higher food value expressed in calories than has the best beef.

	Calories, per lb.
Beef, fresh, sirloin	1,040
Almonds, edible portion	3,030
Beechnuts, edible portion	3,075
Brazil-nuts, edible portion	3,265
Butternuts, edible portion	3,165
Chestnuts, fresh, edible portion	1,125
Chestnuts, dried, edible portion	1,875
Coconuts, edible portion	2,760
Filberts, edible portion	3,290

Hickory-nuts, edible portion	3,345
Peanuts, edible portion	2,560
Peanut butter, edible portion	2,825
Pecans, edible portion	3,425
Walnuts, edible portion	3,105
Malted nuts, edible portion	2,240

NUTS

158. Nuts are not so showy and beautiful as fruits, but they contain far more nutriment. They are very rich in fat or oil, and also furnish albumen, or flesh-building food. In fact, the food value of nuts is now being recognized, and the annual consumption is yearly increasing. Nuts or nut preparations are a good substitute for meat. They are so rich in nitrogenous and fat elements that when taken as an article of food there is little or no desire for meat.

The most wholesome nuts are sweet almonds, pecans, peanuts, English walnuts, filberts, Brazil-nuts, and cocoanuts. Hickory-nuts, butternuts, hazelnuts, beechnuts, black walnuts, are rich and nourishing foods, but all are not able to digest them.

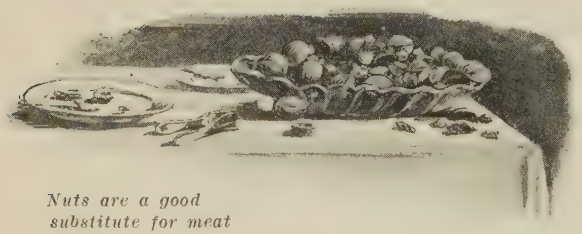


Nuts, even more than fruits, are generally regarded as indigestible. They are not looked upon as foods, in the sense that potatoes and grains are, but are considered a luxury, or used as a dessert, to be eaten sparingly at the close of a meal, or between meals, or as refreshments just before bedtime.

No hearty food is digestible when eaten in that way. If nuts are taken with the

regular meal, if they are eaten slowly and very carefully masticated, they will agree with the majority of people. But every little particle should be crushed thoroughly between the teeth. In fact, chewing of the nut should be continued until it is a milky paste.

It is true that some people can not eat nuts in any form. Such should not try to do so. Some nuts require a special preparation before they are rendered digestible. This consists in some form of cooking. The peanut is very hard to digest if eaten raw, as is also the chestnut. Roasted peanuts are not very digestible. The so-called peanut butter on the market agrees with very few people, and is generally found to be quite indigestible. Chestnuts are more wholesome when roasted or boiled.



Nuts are a good substitute for meat

The table on the following page gives the composition of nuts and some other foods.

By consulting this table the reader can readily see the high food value of all common nuts. While about half the weight of nuts is shell, the edible portion has about three times the food value of beefsteak. Nuts are free from uric acid, waste products, and disease. They come to us from nature's laboratory with all the food elements compounded without adulteration.

It is not necessary to eat a large quantity of nuts in order to obtain sufficient to satisfy the needs of the body. The pecan, for instance, contains over seventy-one per cent of oil fat, and the almond about fifty-five per cent. Moreover, the vegetable fats are more easily assimilated than animal fats, because they are more easily emulsified.

COMPOSITION AND FOOD VALUE OF NUTS

	Refuse	Edible Portion	Composition and Food Value of Edible Portions					
			Water	Prot'n	Fat	Carbohydrate	Ash	Food Val. per lb.
Almonds	64.8	35.2	4.8	21.0	54 9	17.3	2.0	3.030
Brazil-nuts	49.6	50.4	5 3	17.0	66.9	7.0	3.9	3.329
Filberts	52.1	47.9	3.7	15.6	65.3	13.0	2.4	3.432
Hickory-nuts	62.2	37.8	3.7	15.4	67.4	11.4	2.1	3.495
Pecan-nuts	53.2	46.8	3.0	11.0	71.2	22.3	1.5	3.633
English walnuts	58.0	42.0	2.8	16.7	64.4	14.8	1 3	3.305
Chestnuts (fresh)	16.0	84.0	45.0	6.2	5.4	42.1	1.3	1.125
Chestnuts (dried)	24.0	76.0	5.9	10.7	7.0	74 2	2.2	1.875
Acorns	35.6	64.4	4.1	8.1	37.4	48.0	2.4	2.718
Beechnuts	40.8	59.2	4.0	21.9	57.4	13.2	3.5	3.263
Butternuts	86.4	13.6	4.5	27.9	61.2	3.4	3.0	3.371
Walnuts	74.1	29.9	2.5	27.6	56.3	11.7	1.9	3.105
Coconuts	44.8	51.2	14.1	5.7	50.6	27.9	1.7	2.986
Coconuts, shredded	46.0	100.0	3.5	6.3	57.3	31.6	1.3	3.125
Pistachios, kernels	.....	100.0	4.2	22.6	54.5	15.6	3.1	3 010
Pine-nuts	40.6	59.4	3.4	14 6	61.9	17.3	2 8	3.364
Peanuts (raw)	24.6	75.5	9.2	25.8	38 6	24.4	2.0	2.560
Peanuts (roasted)	32.6	67.4	1.6	30.5	49 2	16.2	2.5	3.177
Litchi nuts	41.6	58.4	17.9	2.9	2	77.5	1.5	1.453
Beefsteak	12 8	87.2	61.9	18.9	185	.....	1.0	1.130
Wheat flour	.....	100.0	12.8	10.8	1 1	74 8	5	1 640
Potatoes	20.0	80.0	78.3	2.2	1	18.4	1.0	385

From the standpoint of digestibility, cost, nutrition, and taste, the pecan is the best nut for table purposes.



CHAPTER XVI

Food Combinations

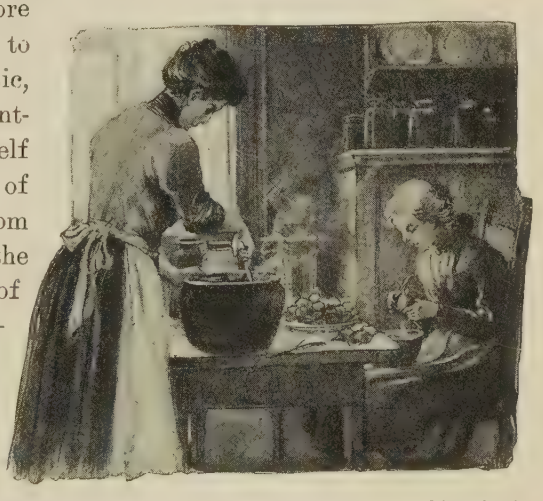
159. Every painter in colors since the world began has had the cardinal colors with which to work. That person only who learns the art of properly blending and using these colors upon the canvas becomes an artist. However, there are artists who produce most beautiful effects and striking pictures with one color. This is done by shading, symmetry, and expression. Sometimes the single-colored pictures are equal to the very best in color combinations.

Music, in its forms, may be classed as melody or harmony. Melody is a pleasing succession of a number of notes continuously following one another, like the song of a bird, the babbling of a brook, a tune sung by a single voice. Harmony is the pleasing blending of different musical sounds uttered at the same time. When this pleasing blending does not exist, there is discord. The person who knows how to combine tones in all their varying shades and degrees is an artist.

But the art of color painting, and the art of music, or harmony of tones, are incomparable with the art of joining or combining foods,— materials which may be converted into beauty of mind, from whence originate all the arts.

A knowledge of the art of combining foods is of far greater service to the race than that of either painting or music. Music appeals to the sense of hearing, and a beautiful

landscape charms the sense of sight, but neither the music nor the landscape can enter the body, to act upon every cell and structure and function. Food must not only delight the sense of sight, smell, and taste, it must enter the body, and become an integral part of brain, bone, and muscle, hence, materially influencing the feelings and the thoughts. If food were taken only into the mouth, chewed, simply stimulating the sense of taste, and then rejected, it would serve a no more important relation to life than does music, sculpture, or painting. Food in itself being a source of life and healing from day to day, and the primary object of life being the development of character, the preparation and combination of foods deserves, therefore, far more attention than it has been customary to give to it.



One who can select, prepare, and combine foods successfully is an artist

As the original meaning of "art" is skilfully to unite, or join, it is natural to conclude that the proper preparing and uniting of foods is an art of the highest order. But as it is to-day, the art that should stand at the top of the list, along with music, painting, and sculpture, that should have the most perfectly and scientifically equipped workshop of them all, whose artists should be recognized and honored as public benefactors,— this art of preparing and combining foods, is placed at the bottom of the list, relegated to the despised and neglected rear of the house, and given over to

the monopoly of the most common and ignorant class of the community. This is wrong, even from the purely artistic standpoint. It has been said that "art is the skilful and systematic arrangement or adaptation of means to the attainment of desired ends." The end of food is to nourish the body, to make bone and blood, brain and brawn. That person who can select, prepare, and combine foods so successfully as to serve this end is an artist second to none. Second-rate artists and second-rate musicians can do no more than make us uncomfortable, but second-rate cooks have sent their thousands to premature graves, to penitentiaries, to hospitals, asylums, and poorhouses.

If one tithe of the money and time spent by young women in acquiring a knowledge of music and painting were spent in obtaining a correct practical knowledge of the best means of preparing and combining foods, this would be a far happier and more artistic world. Most women "of culture" consider this beneath them, and do not know how even to order groceries. A prominent grocer said not one woman in ten knew how to order the daily groceries, nor had any idea of quantity, and then, at the end of the month, would wonder why the grocery bill was so large.

In plants, the original and best food makers, are found the primary foodstuffs, such as starch, proteid, fat, and minerals, repeated over and over again, but in different proportions, to meet all the needs of body and mind under varying conditions. Here we have a practical illustration of food combinations, and one that is quite safe to follow. In these days of "new foods," made by a perfectly "natural process," in fact, very nearly saving man the necessity of digestion, we are inclined to forget that God made our food for us, and made it "very good." While it, no doubt, has deteriorated in value through the ages because of the curse, yet I am inclined to believe that God still makes better and more natural foods than does man.

The food elements required by the body are few in number, but arranged in an almost infinite number of combinations. In nature's great laboratories a sufficient variety of foods is made, and of such flavor and quality as to satisfy the peculiarities of taste under all circumstances.

As a rule, a normal condition of the sense of taste and a normal appetite, together with a reasonable amount of common sense, are safe guides to follow in the selection of the necessary food elements. The subjective needs of the different tissues are made known to the mind by a craving for a certain food; but one never craves a food he has never eaten. Often there is a craving for pickles. The body craves acids, something sour, but the mind, because of habit, interprets this into pickles. Lemons, oranges, or grapefruit would satisfy the longing. A longing for codfish or mackerel or bacon is a longing for salt on the part of the body, because these foods filled the need at some past time. Ordinary salt in food would answer the same purpose. These cravings are present every day (though they may not call so loudly as to attract our attention), and guide in the selection of the different foods. Thus we intuitively eat this or that food, or more of one and less of another, to meet the requirements of the ebb and flow of the vital forces. This is a wonderfully wise provision and a salutary monitor of health. The great trouble is that so little judgment is used in the matter of the quality and quantity of food.

The body possesses wonderful powers in adapting its needs to a certain diet. This is illustrated among various peoples. For instance, the Laplander lives largely upon fat foods all his life. Certain Oriental peoples live almost exclusively upon a starch diet. However, the needs of the body, and, hence, of the mind, are best served by a diet in which the different food elements are in proper proportion, so that it is not necessary to eat excessively of any one food in order to satisfy these needs. In the famine in Ireland, in 1848,

people were found eating from twelve to fifteen pounds of potatoes a day. Analysis of the potato shows that this is necessary in order to obtain sufficient proteid and fat. But in order to obtain these an excessive amount of starch was eaten.

However, in the selection of the necessary quantity of the principal foodstuffs to keep the body in its best working condition, many combinations of foods are made at the same meal that must, in time, impair the efficiency of the human machine. Habit and environment are the powerful factors that militate very much against making the best combinations of foods to meet the needs and the requirements of the system.



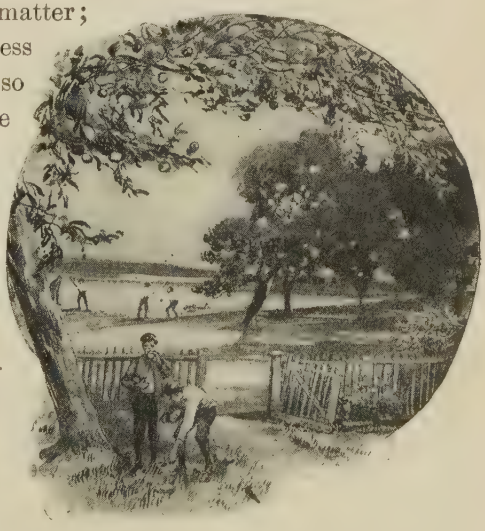
A tempting array

There is much confusion to-day in reference to what is good food, or what foods are good for the needs of the body, because of the difference of opinion among writers, and also because of the spirit of commercialism.

It is not necessary to eat a particular brand of food in order to live healthfully. Furthermore, the confusion is increased by the fact that every article used for food to-day has been condemned and inveighed against by some one. Meat, milk, eggs, salt, sugar, bread, cereals, nuts, fruits, peas, beans, potatoes, and all the vegetables, foods cooked and foods uncooked, each in turn has been relegated to oblivion by some one. In this chaos of opinion or personal hobbies it is not at all strange that people should be inquiring what they shall eat. This is true of man only, for the animals know what to eat, and eat it.

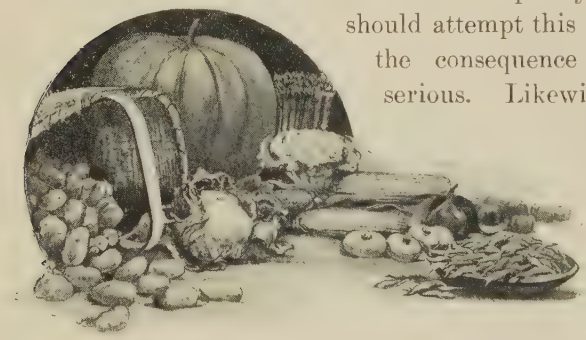
The observation of animals, both domestic and those that hunt for their food, shows that their diet from birth to death is not only simple, but has much sameness. The horse eats hay, oats, or corn, month after month, without variety, contentedly and without loss of appetite. The cow would eat grass the year round, and the lion meat, and always be ready for the next meal. From this we do not conclude that man was to confine himself to two or three foods day after day; for the abundance of foods in nature clearly shows that he needs a variety; but it would indicate that the more simple the variety the better would be the health. There is very little sickness among animals because of their food, especially when they are free to select it.

It is a physiological truth that the less one thinks of what he is to eat, and the more assiduously he lets his food alone after he has eaten it, the better is his digestion. It is not practical for one, as he sits down to the table, to know the relative proportion of the food elements in each food before him, or to make a mental calculation how much he must eat of each in order to obtain the necessary amount of proteid, fat, starch, or mineral matter; but the cook should possess this information, and so plan the meal that there will be harmony in the food from the first course to the dessert. Here is where the housekeeper, the cook, the chef is in a position to wield a tremendous influence upon the mind and body, hence, upon the family, society, and the nation.



As boys we ate green apples to the full

By nature man eats the food that agrees with him best; nevertheless it is scientifically true that a certain combination of foods which at first seemed to be all right, will, in time, effectually impair the efficiency of the digestive organs. As boys we sat down under an apple tree and ate green apples to the full, and then played ball, with never a reminder of the apples, but it would not be expedient to repeat this every day. If the man who sits eight hours a day at a desk in a dark and poorly ventilated room should attempt this gastronomic feat, the consequence might be very serious. Likewise the man who attempts to repeat his boyish trick of eating cherries and drinking milk at the same meal, may suffer from it.



Good enough to eat

It is the multiplicity of dishes that results in so much gastronomic trouble. A large share of the meals that we are called upon to eat are a heterogeneous mass of incompatibilities. The desirable and necessary variety should be sought at different meals, thus avoiding the association of elements that do not and can not agree during digestion.

The adoption of this principle would very much simplify the matter of food combinations. On the other hand, there should not be too much sameness at a meal. A menu consisting largely of bread, rice, potatoes — any one foodstuff predominating — quickly deprives one of an appetite, and robs eating of its charm. However, a large variety of foods is more a matter of habit than a necessity.

When acid fruits are a part of the meal, they should be eaten last; for some are a stimulant to the appetite, hence

increase the flow of digestive fluids, and assist the action of these juices. However, most of the acid fruits do not combine well with a meat diet, or one that is rich in nitrogenous foods, or one in which starch predominates. Young men and women who are vigorous, robust, and bubbling over with life, can make this combination and other combinations and apparently be none the worse for it; but before long the majority of those who do so will have trouble. Starch that has been dextrinized by proper baking agrees perfectly with fruits and their juices. Some fruits and their juices, such as pineapples, cranberries, grapefruit, and papaw, contain a ferment that has a digestive action upon meat or other nitrogenous foods.

A study of the composition of fruits indicates to some extent with what other foods they should be combined. Acids and starches are not found together in fruits that ripened under the influence of the sun's rays. There is some starch in bananas that we get from the market, but this is due to the process of ripening that takes place after they are picked. Acids and fats are not found together except in the olive, in which there is some phosphoric acid. Proteid is present only in the smallest quantities in acid foods. These facts clearly indicate that fruits should not be eaten in combination with a large variety of hearty foods. Most people would, undoubtedly, be better off if they made one meal a day largely of fruit and one or two other light foods, and then at the more hearty meals avoided acid fruit. A free eating of fruit lessens the desire for other sweets. If fruits are taken with the regular meal, they should be eaten at the close of the meal, and not at the beginning; for the reason that the acids of the fruits stop the digestion of starch in the stomach, by destroying the action of the saliva.

A very popular combination of foods, and one that people are extremely loath to give up, is the free use of sugar

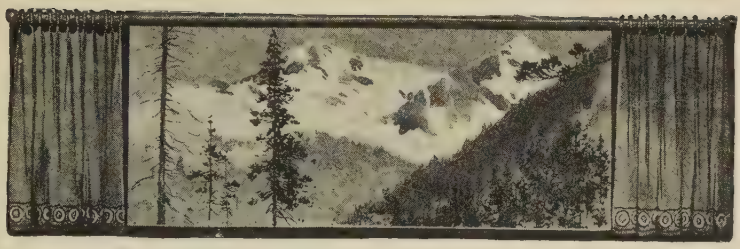
and milk or cream together. Both are wholesome foods in their place, but when put together they are a prolific cause of digestive disturbances. Sugar and milk together, or any other sweet in excess, fairly makes the liver groan with work. Sweets take up so much oxygen from the blood for their oxidation that the liver is gorged with blood, and the digestion of other foods is delayed. When this combination of foods is made day after day, the liver cells finally go on a strike, and a physician must be called to adjust matters. The excessive use of sugar and the constant combination of sugar and milk, frequently give rise to so-called bilious attacks, headaches, and indigestion.

A diet in which nitrogenous foods predominate, such as meats, eggs, beans, peas, lentils, nuts, soon overtaxes the powers of the digestive organs, with resulting coated tongue, headaches, pains, and many other indications of a disordered system.

Simplicity in diet and in food preparation makes living less expensive, gives more time for other pursuits, prevents disease, promotes health, makes one more susceptible to truth, and enables the individual to render a more acceptable service to God.

The living machine is the most marvelous mechanism in the world, operating with the most delicate precision according to laws that are as eternal as the decalogue and no less inexorable. To select and prepare food for so complicated an organism as that of the body, an organism that throbs with life and beams with intelligence, is a service of no mean order. As carbon is crystallized into a beautiful diamond, emitting light, so food not only serves to build up brain, muscle, and bone, and to supply energy, but it is also crystallized into thought and action.

PART TWO



CHAPTER XVII

Divine Healing

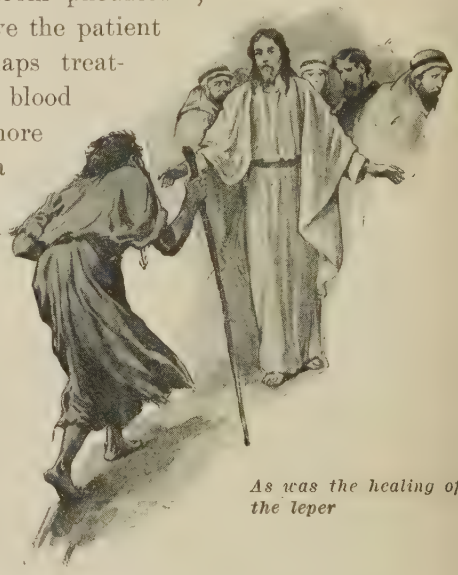
160. Every man that has been sick and recovered, from the time of Adam to the present day, was restored to health by divine power. There is no other healing power. Whether one is restored to health in one second or in one month, it is all the same power at work, namely, the power of life, and there is only one source of life.

It is a natural tendency of the mind to ascribe things we can partly or completely understand to so-called natural causes, but things we do not understand, that are shrouded in mystery, those we refer to God. We circumscribe the Creator by our finite minds. Now, we can understand and explain to some extent the process of repair and healing in the body, but it is no less the work of God than is the instantaneous healing which we can not explain or understand. "For the invisible things of him from the creation of the world



We can see a wound heal from day to day

are clearly seen, being understood by the things that are made, even his eternal power and Godhead." We can see a wound heal from day to day; we note the improvement of a patient convalescing from pneumonia, from hour to hour. We give the patient food and drink and perhaps treatment; we can examine the blood and note its improvement; more than that, because of a knowledge of the structure of the tissues, we can follow the blood with the mind's eye, and see the process of repair taking place. The process of healing has actually been witnessed time and again in a living frog, under the microscope. But, beyond the reach of the microscope and beyond the reach of human reasoning, the mysterious power of life, which we can not see or understand, is at work healing and promoting health. But even that part of this healing process which we can witness is just as marvelous and just as far beyond human power of understanding as was the healing of the leper who came to Christ.



As was the healing of the leper

The declaration made to Moses for Israel, "I am the Lord that healeth thee," has been repeated daily in every individual, from the first pair in Eden to the present day. If the process of healing should cease for one day only, life would be extinguished. Healing is a never-ceasing process in a living body, continuing night and day.

God "maketh his sun to rise on the evil and on the good, and sendeth rain on the just and on the unjust;" likewise

he heals the just and the unjust, and "he giveth to all [good and evil] life, and breath, and all things." This healing process is an ever-present encouragement that he is able to forgive the sins of the one who is being healed. This is illustrated in the case of the man sick of the palsy (Luke 5:18–25), who, because of the press, could not be brought into the immediate presence of Christ, and so was let down through the roof by his friends. This manifestation of faith was rewarded by Christ's saying to him, "Man, thy sins are forgiven thee." The critical scribes and Pharisees did not like this, and they said, "Who can forgive sins, but God alone?" Who possibly can? Christ made answer, "Whether is easier, to say, Thy sins be forgiven thee; or to say, Rise up and walk?" To prove that he has the power to forgive sins, he manifested his healing power in restoring the palsied man to immediate health. "But that ye may know that the Son of man hath power upon earth to forgive sins (he said unto the sick of the palsy), I say unto thee, Arise, and take up thy couch, and go into thine house." In the healing of our bodies, therefore, there is wonderful assurance of his willingness to forgive sins.



He was let down through the roof by his friends

The heart tells us seventy-two times a minute that the blessings of healing are being dispensed to every part of the body. The heart is a living fountain, for out of it are the issues of life, the blood, which is the life of the tissues.

As an engine the heart is a simple but marvelous machine. Without steam, without coal, without wheel or cylinder, it runs day and night, year in and year out, seventy, eighty, it may be a hundred years. It beats on the average of seventy-two times a minute, and forces out more than six ounces of blood at each beat. It performs a wonderful amount of work in a day, as can be easily determined by a little figuring.

This fountain, or engine, or force-pump, never stops more than a fraction of a second for repairs. The great Builder has made it so that it is constantly renewing itself without hindering the work of the body. Though it is a living fountain, or engine, it can not work without rest. The heart rests about five-tenths of a second at a time after it has forced the blood into the aorta, before the next contraction. In twenty-four hours this five-tenths of a second rest amounts to fifteen hours. So the heart does nine hours of high-tension work a day. This is God's division of time into work and rest. Nine hours of high-pressure work is about all the living tissue can stand without injury.

The largest artery in the body is the aorta. It begins at the large end of the heart, arches up over the heart, then passes downward back of the heart, nearly through the entire trunk in front of the back-bone, and behind nearly all the important organs. At different points along its way it gives off branches to the heart, the brain, the spleen, the intestines, the kidneys, and the muscles.

The arteries (which were so named because at one time they were supposed to contain air instead of blood) diminish in size as they go away from the heart, and they divide and subdivide until there are nearly a thousand in the body. The more branches are given off, the smaller and smaller they become, until at last they are as fine as hairs, and the little blood-corpuscles have to go through them in single file. Now they are called capillaries, from the Latin *capillus,* meaning hair. The capillaries are very delicate and short, and so

numerous that they form a perfect network of blood channels through every organ and tissue of the body. They are especially numerous directly under the epidermis.

The capillaries are very important, for they are directly concerned with the process of healing and repair, whereas the large and small arteries are simply avenues of communication, channels for the outward flow of the stream of life.

The capillaries can hold much more blood than the large arteries, and, being so much smaller, the blood flows through them much more slowly. By the time it reaches the capillaries the stream that flowed in the aorta at the rate of fifteen inches a second, has slowed down to about one inch in twenty seconds. The reason for this will be seen more clearly a little later.

Every cell worker of the body is dependent for food and life upon the stream that flows through the living fountain. If anything happens to prevent the blood from reaching any part with its healing power, that part will mortify and die in less than two days. Furthermore, the health of every cell depends upon the freedom with which the blood flows to it. The more perfect the freedom, the more perfect the health.

The weight of the blood is about one-thirteenth of the weight of the body. A man or woman weighing one hundred thirty pounds has ten pounds of blood. One-fourth is in the heart and great blood-vessels and the lungs; one-fourth is in the liver; one-fourth is in the muscles; one-fourth is in the skin and other parts. The blood is so distributed in the normal body among all the parts, that each has enough to do its work perfectly. But there is never enough blood in the stream at any time to fill every part full, so it is not according to the divine plan for every organ to be working at its greatest capacity at one and the same time.

The stream of life, examined under the microscope, is more than a fluid. It contains tiny moving saucer-like bodies, of a pale straw color, called red blood-corpuscles, from the Latin

corpus, meaning body, and an ending meaning little. They are so small that if three thousand two hundred were placed edge to edge they would make only one inch, and if twelve thousand eight hundred were placed on top of each other the pile would be only one inch high. In a cubic space one twenty-fifth of an inch on each side there are five million of these bodies, and in an adult something like eighteen trillion. In addition to these there are thirty billion white blood-cells, the standing army of the body.

About eighty per cent of the blood is fluid. This fluid is called plasma. It is colorless when separated from the blood-cells.

The color of the blood is due to the presence of a coloring matter in the red cells, called hemoglobin. In the lungs this coloring matter unites with the oxygen and turns the blood from a purple to a bright red. When the hemoglobin is deficient in the blood, the red cells can carry but little oxygen, and the repair of the tissues is very slow.

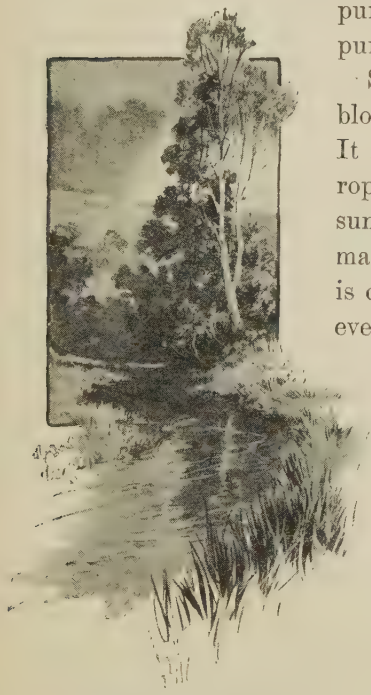
The blood-cells are very little bodies, but with such a mighty host harmoniously engaged in a beneficent object, a marvelous amount of work is accomplished every twenty-four hours.

Every corpuscle is an indefatigable worker. In fact, the corpuscles work so continuously that they live only from four to six weeks. Every six weeks the whole volume of the blood is completely renewed. The stream of life flows from the living fountain, carrying these billions of red cells, with their cargo of life, to every worker of the body. In this cargo is oxygen, food, and stored sunshine. In the lungs each red cell breathes in oxygen until it can hold no more, and then the blood fluid, the plasma, absorbs all the oxygen it can hold; then it flows on to the left side of the heart, and this little engine gives it a tremendous squeeze, and sends it rushing through the arteries to the remotest parts of the body.

As the oxygen is taken from the air we breathe, it should

be fresh and pure. It is absolutely essential to the health of every cell worker. Blood-cells that are stinted in quantity or quality of air food droop, and pine, and grow pale, and waste away; and so do we, as a natural result. Oxygen refreshes the red cells, just as we are refreshed by throwing the doors and windows open. It is freighted with life and energy. Hence, to breathe fresh, pure air, and abundance of it, is one of the first essentials to healing and physical vigor. God can not keep life in the body that refuses to breathe pure air, or that interferes with free breathing.

Food is another important part of the cargo, but this is mostly in solution in the fluid part of the blood. The cell body gets hungry and needs to be fed. Then we — all our cells — cry for food. The blood is made of food, drink, and air. If the food is pure and wholesome, the blood will be pure. There is no magic blood purifier.



Sunlight stimulates life

Sunshine is as essential to the blood as it is to the growth of plants. It is sunshine that develops the chlorophil, or the green in plants, and sunshine that develops the coloring matter of the blood. Stored sunlight is carried by the blood, which makes every cell work more briskly and more skilfully.

So the blood is laden with life; for air is a life-giving element, and God gives it. Food sustains life, and God makes it. Sunlight stimulates life, and God causes the sun to shine. Water is healing and life-giving, and God sends the showers of rain. The

blood carries them all. It is the life of the flesh; it is a continuous medium of divine working.

In the capillaries the blood flows very slowly as compared with the rate of flow in the large arteries. This is the reason: In the capillaries the blood plasma first gives up oxygen, so that the cell workers may breathe and breathe. In addition, it gives up food, so that the cells may be nourished. Then the red blood-cells give up their cargo of oxygen. In exchange for these, the tissues give back waste matter, broken-down material, and poisonous gases. This exchange goes on quickly through the wall of the capillaries, which is as delicate as a soap-bubble.

The blood now starts on its way back to the heart, not empty-handed, but loaded with waste and poisons. It goes, however, by another route. For this trip it goes by way of the veins, and, instead of being a bright red, is purple in color.

We can trace the process of healing a step further, and then the veil drops. The capillaries, though so small and so delicate, do not carry healing materials directly to the cell workers. Between the cell worker and the capillaries there is a water-like fluid, called lymph. No two cells of the body are in direct contact, for the lymph surrounds and bathes each cell. The capillaries drop their cargo of food and oxygen into the lymph, and the cells pick it up as it floats along. The cell drinks, and eats, and receives its air from the lymph. Alone, and separate from its fellows, it eats, and breathes, and works, and throws off waste, and rests. This is assimilation. This is divine healing, for it could be nothing else. This is exactly what takes place in the restoration of the body after illness. "I am the Lord that healeth thee."

Suppose one has a sore finger. It proves to be a felon. Now what takes place? — The white blood-cells, the standing army of the body, are called to arms, and in troops of millions they hurry to the point of attack. They rush upon

the invading enemy, the germs, and there is a battle royal. The white cells devour the germs, literally tumbling over one another to get at them. They become so numerous that the finger swells, and they crowd upon the nerve ending, so that we suffer pain. On the other hand, the germs throw out a poison, and kill large numbers of the white cells. As the conflict proceeds, the living white cells cut off the food supplies of the enemy, by building a wall of defense around them, and making it so hard that the germs can not get through. All this time the red blood-cells and the blood have been supplying the defendants with food, drink, and air. The dead white cells are piled in among the germs and form pus. Slowly the white cells win the day. They come in with the stretchers and carry off the dead, and destroy the poison by absorption, and gradually remove the breastworks which they erected.



The physician at the bedside of the sick

This is exactly what takes place in abscesses, pneumonia, and diphtheria, only on a more gigantic scale. The physician, as he stands by the bedside, knows that there is a tremendous battle raging within the sick body. But he has great confidence in the cell workers, and takes sides with them. He knows that he possesses no healing power — he is only an assistant — and so does his best to co-operate with the healing powers of the body.

To heal is the natural tendency of all the vital powers. In acute infectious disease very poisonous substances are produced by the infection, causing a profound action on all the

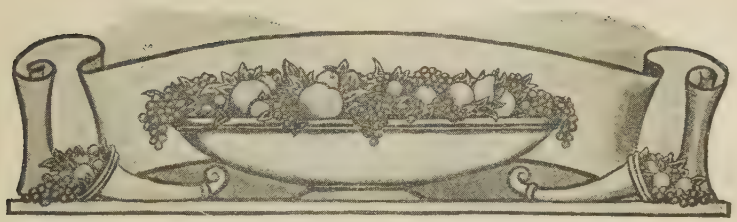
organs. But by a mysterious process, possibly in the blood, a counter substance is produced, that acts as an antidote to these poisons, and so protects from injury. This power varies according to the natural resistance of each individual.

In addition to the blood, there are many other factors at work concerned with healing and repair. There are many internal secretions that possess extraordinary powers in helping to maintain health. Just above the kidneys is a little ductless gland, called the suprarenal gland. It furnishes secretions that keep the blood-vessels in good tone. If an extract of this gland is injected into the body, it restores tone to the vessels. If applied to a bleeding surface, it checks hemorrhage. There is a ductless gland in the neck, called the thyroid gland, the secretions of which exercise the most profound influence upon nutrition.

While we can not heal or cure the simplest bodily difficulty, we can do much to help or hinder the process. Healing is promoted by eating wholesome, pure food properly; by drinking an abundance of pure water; by breathing the purest air; by exercising sufficiently to keep the muscles strong and the elimination good; by taking sufficient rest and sleep. During sleep the heart obtains very much more rest, and the body stores up large quantities of oxygen, so that repair and healing are greater during sleep than when awake.

Healing is greatly promoted by a proper mental equilibrium. Cheerfulness and hope are a host in the healing art. A mind dominated by love and peace removes all nervous tension, and the blood flows freely to every part of the body. Restful confidence relaxes the blood-vessels, and the healing stream goes bounding faster, freighted with life. Unselfishness, doing for others, will cause the health to "spring forth speedily." Fear poisons the blood and weakens the heart. If a sudden brief fear will cause a chill and a cold, clammy skin, what must be the effect when one is in a moderate state of fear and worry most of the time?

PART THREE



CHAPTER XVIII

Nature's Remedies

161. *Sunshine.*— The sun is the great source of energy in the world. Because of its beneficent influence upon the earth, plant, animal, and human life are made possible. The sun warms the air and the earth. It is the cause of currents of air, winds, clouds, and rain.

Sunshine is a marvelous health-giving and healing power in the world. While sunshine is death to disease-producing agencies, it is life and health to all natural forms of life. Sunshine is inimical to all forms of disease-producing germs. The sun's rays are destructive to all germs in a few hours, when exposed directly. Even the germs in tubercular sputa are destroyed in a day or two when exposed to the sunshine.

The energy of the sun as manifested in plant life is something marvelous. It is the genial rays of the sun that call forth the sleeping grass and plants and seeds in spring-time, — a veritable resurrection of life. It is the sun that calls forth the sown wheat and oats, and the planted corn, and other cereals, cracking the crust of the earth and lifting these tiny blades into the air. If all the tiny cracks thus made in the

earth were united in one great fissure, what a mighty earthquake there would be! And yet the sun does this almost without our notice.

While man possesses no means of materializing sunshine, yet we see this phenomenon taking place continually in the vegetable world. Sunlight in some mysterious manner has a vitalizing power upon plant life, and, uniting with carbon, hydrogen, and oxygen, is stored in the form of potential energy for future service.

We know very little about light, and yet on analysis it is shown that a sunbeam contains heat rays, chemical rays, and light rays. Heat rays are the means by which the earth is warmed. "And there is nothing hid from the heat thereof." The light rays flood the earth with light. The chemical rays give the grass its green, and tint the flowers and fruits with their peculiar and rare colors. It is the chemical ray that causes the skin to tan. These rays are a vital energizer to the nervous system of man and animals, and are absolutely essential to life. Without sunlight plants are sickly in color and fail to develop chlorophil, the green coloring matter. Without sunlight man is pale, sickly, and anemic, for, as in the plants, the blood lacks coloring matter, or hemoglobin.

During the last few years the X-ray and the Finsen light have been discovered, both of which are now being used extensively in the treatment of malignant tumors and skin diseases. All the properties of the Finsen light are in the sunlight, and so are the properties of the X-ray.

It is perfectly evident from these discoveries that the sunlight is a powerful healing and remedial agent. Skin diseases and malignant diseases are much less common among those who spend a large share of their time in the open air, exposed to the light. If the entire body could be daily exposed to sunlight, as is the face, man would be far healthier and happier. Light promotes health; darkness fosters disease.

A sun-bath should be taken every day. Especially is this

necessary in tuberculosis, when the entire body, or the chest, or the part diseased, should be exposed. If such treatment will help to cure the disease, it would prevent it altogether if its value were appreciated. Those who spend most of their time in poorly lighted rooms, lack color, energy, vigor, and cheerfulness. Several hours a day should be passed in the open air. Sunlight calms the nerves, relaxes the blood-vessels, and restores the depleted vital energies. It drives away the blues, despondency, and is a wonderful sleep restorer. It is heaven's free gift to man, and can be had for the taking. No human being need be deprived of this, nature's most potent healing remedy. Every opportunity possible should be sought to obtain the beneficent influence of sunlight at least a portion of each day. Sit in the sun, recline in the sun, walk on the sunny side of the street, avoid parasols, and ever recognize the sun as a friend and not an enemy, a promoter of health, and a destroyer of disease.



Sit in the sun

162. *Fresh Air.*— The freshest air is inseparably associated with sunshine. The air is purified by the sun, the rain, and the breeze. The sun is destructive to germ life; the rain precipitates all impurities to the earth, in other words, bathes the air; and the breeze keeps it in motion, which is absolutely essential to pure, fresh air.

In the living room and in the sick room every possible provision should be made for abundance of fresh air as well as light. Air is food to the blood and tissues, as are bread,

wheat, or corn. Breathing impure, vitiated air quickly lowers the vital resistance and causes anemia. Deep breathing, the result of working or exercising in the open air, is absolutely essential to health and vitality.

163. *Electricity.*— This is a remedy that has been used a great many years in the treatment of disease. While it is not necessary in most cases, and should not be used in acute diseases excepting in some nervous manifestations, it is many times a valuable remedy in treatment.

Electricity should not be used except by a physician or a nurse trained in its use; hence the different forms of electricity will be but briefly mentioned.

The faradic current is an interrupted current, and is used for the relief of pain, as a tonic, and to stimulate nutrition. In using a faradic battery in the home it is best to have a dry-cell battery, for then there is no danger of spilling fluids. The dry cell can easily be renewed.

The sinusoidal current is a wave-like current, and very agreeable, as it is devoid of many of the irritating qualities of the faradic current. The effects to be obtained from this current depend very much upon the speed of the machine. It is used to develop muscle, in the electric bath as a nutritive tonic, and to relieve pain.

The galvanic current is a continuous current, produced by cells or by a dynamo. The effects to be obtained from this current depend entirely upon which electrode is used and the size or material of the electrode. Galvanism is used to relieve pain, to break down tumors, to remove hair and skin blemishes, and it is of great service in the treatment of many diseases.

Static electricity is entirely different from the above currents, but may be used for many of the diseases in which the other currents are used. It is produced by a machine, and is applied to the patient while he is insulated on a platform.

The X-ray is produced by conducting the current of a static machine or an X-ray coil through a properly constructed vacuum tube. At the present day there is little danger of causing an X-ray burn if the X-ray is in the hands of a skilful operator. The X-ray is now used in treating cancer and other tumors, eczema, psoriasis, acne, and many other skin diseases. It is an exceedingly valuable means when used judiciously, and it is doing a great deal of good.

164. *Water and Its Use.*—Water is the most universal element found in nature, as well as the cheapest and the most accessible. It is the most common solvent within and without the body. It is indispensable to plant and animal life, and constitutes a large proportion of the weight or bulk of all forms of animal life.

The use of water as a remedial agent in the treatment of disease antedates that of any other remedy known to science. All the drugs of the pharmacopeia in use to-day, and most of our therapeutic methods, are very modern as compared to this ancient remedy.

While the most ardent enthusiast in hydrotherapy does not claim that water is a panacea for all the ills to which the flesh is heir, nevertheless, a close study of its many effects and reactions upon the human organism must impress one that it more nearly approaches a sovereign remedy than does any other therapeutic agent.

Water is the most widely distributed element in nature; it is almost always to be found near at hand; it is inexpensive; it can be used successfully in the treatment of more diseases than any other remedy, and no known drug is capable of producing so great a variety of physiological effects as can be obtained by means of this limpid element.

For hundreds of years water was used empirically, and too often was principally in the hands of the laity and charlatans. Because of the unskilful use of this powerful agent, and the disastrous results that frequently followed its appli-

cation, much odium was brought upon its use in the treatment of disease. During the past century, however, there were many pioneers in hydrotherapy who did much to place it on a scientific basis. To Winternitz more than any other investigator must be given the credit of having placed hydrotherapy upon a thoroughly rational and scientific foundation by means of his classical experiments and accurate data.

165. *Hydrotherapy.*— This word means simply the use of water in the treatment of disease. Water as a remedy has been used much more extensively by the profession in Germany and Austria during the last century than by that of any other country.

A large portion of the American profession as well as the laity are still afflicted with hydrophobia (that is, fear of water), due principally to water being used empirically and unscientifically, and hence with unsatisfactory results; for it must be borne in mind that so powerful an agent as water, like a powerful drug, if unskilfully used, is capable of producing much harm.

There are doubtless several reasons why hydrotherapy is no more extensively used by physicians to-day than it is, in the treatment of both acute and chronic diseases. In the first place, the subject is barely mentioned in the medical schools, and only in one or two medical schools does it have a place in the curriculum. Hence, for a physician to acquire a knowledge of the subject he must either study it up and perform many experiments, or take a post-graduate course, which necessitates a trip abroad, as there is no hydriatic clinic in this country. Second, the extensive employment of hydrotherapy, whether in private practise or in institutions, requires a trained nurse, and there are few trained nurses prepared to give skilfully a hydriatic treatment, because of the lack of training. The results which a physician expects to obtain may be entirely frustrated by a poorly given treatment. Proper education will remove both these objections to the

more common employment of hydrotherapy in the practise of medicine.

In order to be able to use water scientifically, it is absolutely necessary to have a thorough knowledge of anatomy and physiology. Especially is it important to know the anatomy of the nervous and circulatory systems and of the skin. The fifteen to seventeen square feet of skin that covers the average adult is a highly sentient organ, intimately related to the central nervous system through the millions of nerve endings represented among its epithelial cells. It is principally through this sensitive organ that the hydriatist produces the desired physiological action in the cure of disease.

The skin is to him what the cords are to the harpist. It is one vast reflex area, in which are represented every organ, and gland, and muscle. As a rule, every organ is in reflex relation with the skin immediately over it; however, many organs are, in addition, in reflex relation with remote portions of the skin. For instance, the palms of the hands are in reflex relation with the mucous membrane of the nose and with the brain; the plantar surfaces are in relation with the bladder and the uterus; the integument over the lower third of the sternum, with the kidneys. Possessed of a knowledge of all the reflex areas of the skin, one can obtain a local or general effect at will in the use of hydriatic procedures — a fact which is highly important in the treatment of various diseases.

It is well known that washing the face with cold water is wonderfully refreshing and restful. The cold to the face excites the nerve endings of the tri-facial nerve, which in turn reflexly contracts the cerebral blood-vessels, and increases the venous flow from the brain. It is well known among women that the menstrual flow may be suddenly checked by cold wet feet.

Now it logically follows that if one may be so refreshed by simply bathing the face with cold water, a much greater

effect can be obtained by a proper general application; and if this is repeated daily, marked physiological changes may be wrought in the body. This is a principle that applies to every hydriatic procedure, whether local or general in application.

Water not only makes up sixty-six per cent of the total weight of the body, and forms a part of every tissue, but it is also a convenient means of inciting the nerve centers, of communicating heat to the body, and of promoting a loss of heat from its surface. Upon these facts depends its physiological action.

166. Any application to the body at the temperature of the skin is neutral in effect, and hence is neither exciting nor depressing. Any application at a temperature above that of the skin is interpreted as warm or hot, and any application below the skin temperature is recognized as tepid, cool, or cold. The nerve endings can not differentiate between extremes of heat and cold, and hence the effect is the same. In individuals unaccustomed to hot or cold applications, and in certain diseases, the skin has to be educated to variations in heat and cold. In oversensitiveness of the skin in locomotor ataxia this is especially noticeable.

The physiologic effects which we wish to obtain from a certain treatment will depend on whether hot or cold is employed, the degree of each, the force if it be a douche, and the duration. Most of the physiological effects of hydriatic treatments are due to so-called reactions and to the mechanical influence upon the blood and lymph.

167. The following are some of the hydriatic procedures used in the treatment of acute and chronic disease: The shower, the spray, hot or cold; the douche, hot or cold, alternating; percussion, local or general, named according to area treated; the Brand bath, Bouchard bath, or graduated bath, the neutral bath, half bath, hip or sitz bath, leg bath, foot bath, arm and hand bath; simple sponging, friction,

towel rubs, wet sheet rubs, pail pours; hot or cold compresses, named according to location, alternating compresses, evaporating and non-evaporating compresses; the moist girdle; the dry blanket pack, the wet blanket pack, trunk pack, chest pack, hip and pelvic pack, leg pack, wet sheet pack; enemas, douches, and effusions. All of these treatments can be given in the home excepting the brand bath, the graduated bath, and sprays.

By the employment of one or more of these measures or combinations the following effects may be obtained: Tonic, local or general, sedative, antispasmodic, nutritive, eliminative, diuretic, expectorant, antipyretic, antiphlogistic, hemostatic, emmenagogic, analgesic.

168. In the description of the various uses of water no attempt will be made to go into detail about physiological action, or the different diseases wherein it should be used. To know the method is most essential for home treatments, and the treatments will be indicated by numbers when describing the different diseases.

169. *Water Drinking.*—To drink water is but to follow an instinctive demand of the body, yet it is true that people as a rule do not drink sufficient water. Sir Lauder Brunton says that gall-stones and renal stones would be unknown if people drank sufficient pure water. On hot days, and when perspiring freely, usually sufficient water is taken; but there is a very large class of individuals who, because of inactive skins and inactive kidneys and bowels, drink very little water, when they should drink freely. A little fruit juice given in water may make it more desirable.

An adult should drink from three to six pints of water every twenty-four hours. It is better to take this in small quantities, from a quarter of a glass to a glassful, at frequent intervals, than to deluge the stomach with a large quantity, especially directly preceding or following a meal.

Ice-water drinking should be avoided. The temperature

of the water should be that of the average deep well, which is usually between 60° and 70°. Drinking ice-water when perspiring and exhausted is a dangerous procedure. Unless one has catarrh of the stomach, it is a good plan to form the habit of drinking a small glass of cold water half an hour before meals and on going to bed. Cold water is just as refreshing to the stomach as it is to the face.

Where it is impossible to obtain ice, or in hot climates, water may be made cold by the following method: Wring cloths out of water in which ammonium acetate, two ounces to the quart, has been placed, and apply around a pail, pitcher, or bottle of water. The rapid evaporation of the wet cloths will cool the water.

Cold water should be drunk freely during all fevers and acute sicknesses. But in typhoid fever very cold water excites marked intestinal movements, which is not always desirable. In catarrh of the stomach, drinking very warm water one-half hour before meals will wash out the mucus and clean the stomach.

In "heartburn," and in marked acidity of the stomach contents following a meal, drinking hot water will relieve the gastric distress. Two or three glasses may be necessary.

Water should be given freely to infants and children. A few teaspoonfuls of warm water given to a young infant two or three times a day, even though it objects, will encourage the formation of an excellent habit. The crying of very young children is frequently caused by thirst, and not hunger. When a child has gas on the stomach, giving a few teaspoonfuls of quite warm water, and then holding the child upright, or with the head on your shoulder, will afford almost immediate relief.

Fresh rain-water caught in clean vessels is the best water, if it is not the first of a shower after a dry spell. Distilled water well aerated is very pure and wholesome. Water from very deep wells and many natural springs is quite pure, and

does not require boiling. Water from any other source, used for drinking, requires boiling for fifteen minutes. It should then be cooled in the open air.

Drinking water obtained from shallow wells, small streams, and irrigation ditches, especially in warm or tropical climates, is a prolific source of typhoid fever, malaria, yellow fever, dysentery, and other diseases.

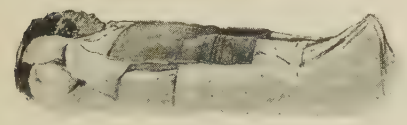


FIG. 50
Fomentation to stomach and bowels, first cloth in position

Sipping a cup of cold water very slowly is a good heart tonic, making the heart beat slower and stronger. Drinking a quantity of any hot fluid increases the heart-beat. To induce vomiting, in order to empty the stomach of undigested food, drink in rapid succession two to four glasses of lukewarm water, with a teaspoonful of salt to the glass; or a little ground mustard may be used in place of the salt.

170. *Fomentations.*— This is one of the most simple, common, and effective means of using water in the treatment of disease. The best material for fomentation cloths is heavy flannel. A single flannel blanket, costing two or three dollars, will make two pairs of fomentation cloths. Every household should be supplied with them, ready for any emergency. Such an investment will save many dollars, otherwise spent in medicines, liniments, and doctor bills. In place of flannel blankets, woolen underwear may be substituted. Fomentation cloths, to meet all conditions, should be a yard long and nearly as wide.

In giving fomentations, boiling water should be used. Fold the cloth

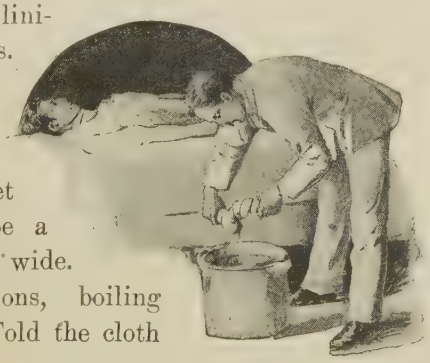


FIG. 51
Fomentations, wringing second cloth from boiling water without burning hands

one way, the longest way, if there is a difference, and dip it into the hot water, keeping the two ends dry for a few inches. Twist the two ends quickly in opposite directions, and then pull, holding the cloth over the water, again twisting. In this manner it can be wrung sufficiently dry, and still not burn the hands. Wring very dry. Fold quickly in the dry cloth, and apply to the desired area. For the first fomentation there should be two thicknesses of flannel between the hot wet cloth and the skin. As soon as one becomes accustomed to the heat, one thickness is sufficient. Care should be exercised to not give too hot applications to children, or to aged people, or in dropsy, in paralysis, or over a bruise. The more water the fomentation cloth contains, the hotter it will seem.



FIG. 52
Fomentation, wet cloth folded and in position

For application to the spine the fomentation cloth should be about six or eight inches wide, and extend the entire length of the trunk. Over the chest, stomach, liver, or bowels, it should be wider and shorter, all easily arranged by proper folding. Do not unwring your fomentation cloth until you are by the side of the patient. If a fomentation is too hot, lift it up for a second, or run the hand under it when applied to the spine. This lets in a little air, and has a cooling effect.



FIG. 53
Fomentation, wet flannel covered by the dry one

For a tonic and nutritive effect, and when followed by cold treatment, the fomentations should be continued from

ten to fifteen minutes, and changed every three to five minutes. When applied to relieve pain, they should be continued longer; it may be necessary to continue them from thirty to sixty minutes — not so long, however, when the patient is weak or feeble. In all cases they should be very hot, hence it is unnecessary to use the term "hot fomentations." Fomentations to the eye or the scalp should be from five to ten minutes.



FIG. 54
Method of applying fomentation to the spine

Fomentations will relieve nearly all kinds of pain, and it is always safe to use them. They are far superior to liniments and ointments of all kinds, and ought entirely to supplant the poultice, which is both dirty and unpleasant. Their effect is greatly increased by following them with cold compresses, to be changed every ten or fifteen minutes.

Fomentations to the spine quickly induce perspiration if the patient is covered with blankets. This should be avoided in weak patients, and when given to the spine for sleeplessness.

In any case after a fomentation, apply cold to the area for a few seconds. Then rub dry with a towel.

171. *Hot Foot or Leg Bath.*— For a hot foot bath, the ordinary tin foot-bath tub, a large pail, a wash-bowl, or even a tub may be used. A large tobacco or candy wooden pail is excellent for either the foot or leg bath. In the foot bath, the water should be above the ankle, and the temperature should be about 110° to start with, and kept up by adding a little hot water. The feet are



FIG. 55
Fomentation to the spine and hot foot bath combined

quite sensitive to heat. The bath should continue from five to twenty minutes. The hot leg bath, requiring a deep vessel and more water, and covering more surface, has a greater effect than has the foot bath.

The hot foot or leg bath, if prolonged to fifteen or twenty minutes, is a very effective means of producing perspiration. If such an effect is desired, surround the patient with blankets, and have him drink hot water or lemonade. Then put him to bed, well covered, and allow the sweating to continue.

The hot foot bath is excellent in congestive headache, in the beginning of a fever, in inflammation of the pelvic organs, to overcome chilly sensations, to produce perspiration, and for sore, tired, or aching feet, or for cold feet.

In giving the hot foot bath for headache in typhoid fever or pneumonia, it should be only from three to five minutes in duration; otherwise it may increase the temperature.

One or two tablespoonfuls of ground mustard, stirred into the hot water, will intensify the effect of the bath. In fevers and with weak patients give the foot or leg bath with the patient lying down.

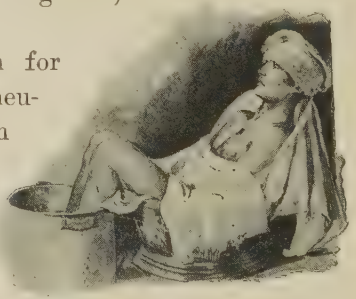


FIG. 56
Sitz and foot bath combined, with cold compress on head

172. *The Sitz Bath.*— This is the same as the hip bath. An ordinary tub may be used, or one may be made from a good barrel. There are cheap tin sitz bath tubs on the market which are very serviceable.

The cold sitz, temperature, 50° to 70°, and the hot sitz, 105° to 115°, are the two most common and useful forms of taking this bath. The duration in either case is from five to fifteen minutes.

When taking a sitz bath, the feet should be outside in a

smaller tub of warm water, except in taking a neutral sitz bath, when this is not necessary. In taking a cold sitz bath, the feet should be in hot water. This is sometimes necessary in hemorrhage from the uterus, vagina, or bowel.

In the last two or three months of pregnancy, the neutral sitz bath, continued for fifteen minutes, beginning at 95° and gradually cooling to 85°, is a most effective means of inducing an easy labor, of relieving pelvic distress, and of promoting sleep. It should be taken at bedtime. Dry well.



FIG. 57
Sitz bath, patient protected by a blanket

The hot sitz is an excellent means of relieving pelvic pain due to inflammation of the uterus, ovaries, vagina, or bladder, and severe pain during the menstrual period, or just preceding it, or to bring on the menses. In the latter case it may be necessary to repeat the treatment several days in succession, even two or three times a day. It is also good to relieve pain in the hips.

The hot sitz bath should be followed by a dash of cold water, or the parts should be rubbed with a cold wet towel, and then with a dry towel.

The cold sitz bath, 50° to 60°, is sometimes used to stop uterine hemorrhage, or an excessive menstrual flow. In this case the feet should be in hot water, the patient rubbed to prevent chilling, and the bath continued for ten or fifteen minutes.

173. *The Tub Bath.*— This may be hot, 102° to 110°; warm, 98° to 102°; neutral, 98° to 92°; cool, 90° to 80°; cold, 60°, or graduated, 100° to 85°, reducing it one degree every three to five minutes, at the same time rubbing the patient to prevent chilling.

The warm bath is used principally for its cleansing effect.

The hot bath, 102° to 110°, for ten minutes, then twenty minutes at 100°, is an excellent way to relieve fatigue and sore muscles due to exercise. In the beginning of scarlet fever or measles, the hot bath, 105°, for ten minutes will bring out the rash. For chronic rheumatism, the hot bath, 105° to 110°, for ten minutes will give much comfort and relief. It should be taken at bedtime. The hot bath will give relief in painful menstruation, and has a tendency to establish the flow.

The hot bath should be avoided in heart-disease or when there is a weak heart.

174. *The Neutral Bath.*—Water from 98° to 92°. This is one of the most efficient water treatments, and a very pleasant one. The bath should be given in a moderately warm room, and continued from fifteen minutes to one hour. When given once a day, it is best given at bedtime.

The neutral bath relaxes the blood-vessels in the skin, and so draws the excess of blood from the brain and spinal cord; it soothes the nerve endings in the skin, and increases the activity of the kidneys. For this reason it is an excellent treatment for sleeplessness due to nervousness. It is especially indicated in nervous exhaustion, twitching or jerking of the muscles due to nervousness, in irritation of the skin often present in Bright's disease, in hives, and to reduce fever. In some forms of nervousness, especially after discontinuing drug habits, or leaving off alcohol, this bath or the neutral galvanic bath may be given every two or three hours for fifteen to thirty minutes.

Following a neutral bath, the patient should be dried off with as little excitement as possible, and put directly to bed. Chilling should especially be avoided.

175. *Blanket Packs.*— In this treatment three or four blankets are required, or one blanket and one or two comforters will do. It may be given on a bed or couch. As the object of the dry pack is to induce perspiration, or to

get the patient warmed up, it is best to precede it with a hot tub bath or hot foot bath if possible, also hot water drinking.

Spread three blankets or two comforters upon the bed and a blanket over these, all covering the lower edge of the pillow. Have the disrobed patient quickly lie down, wrap the blankets rapidly around him, tucking the edges up carefully, especially about the neck and shoulders, and have them comfortably tight. Only the patient's head is out. When a very rapid action is required, hot-water bags, bottles, or hot bricks should be placed about the patient, but guard against burning. Be sure to see that the feet are warm, and well wrapped up. Have the patient drink water freely, either hot or cold.



FIG. 58
Blanket pack, patient partly wrapped

The dry blanket pack should continue from one-half hour to two or three hours. It should continue two or three hours when trying to break up a cold. A short treatment does very little good.

This treatment may be used preceding a chill in malaria, or in the beginning of a fever, especially if there are chilly sensations. It should not be long continued when there is a high fever.

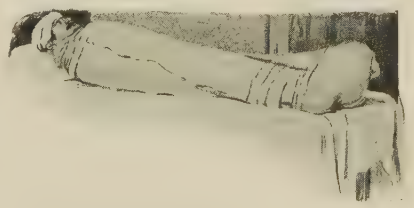


FIG. 59
Blanket pack completed, or wet sheet pack completed

The blanket pack should always be followed by some vigorous cold treatment, such as a cold friction or a cold towel rub.

176. *Hot Leg Pack.*— Three blankets are necessary, one

spread the entire length of the couch, one over this folded in the middle so as to reach from below the feet to the hips, and a third folded in the middle wrung out of boiling water. To do this, fold the blanket through the middle and then a number of times, dip it in the hot water, leaving the ends dry; then two persons, one at each end, can quickly twist it until it is quite free from water. Keep it twisted until the bedside is reached, then spread it quickly, and have the disrobed patient lie down at once. If the blanket is too hot, spat it a few seconds with the hands. Wrap the wet blanket around and between the legs and feet, and then draw the other folded blanket over this, wrapping it closely about the legs. Over this draw the third blanket or quilt. This pack may be reenforced by placing three spine bags, about one-fourth full of very hot water, between the first and second blankets, under the patient, and one at the feet.



Fig. 60
Method of wringing blanket from boiling water by keeping ends dry

The hot leg pack is frequently combined with the ice-bag or cold compress applied locally, as in appendicitis, when the ice-bag is placed over the lower right side of the abdomen; in pelvic inflammation, when it should be placed over the ovaries or uterus. Cold compresses are applied to the abdomen in intestinal inflammation. When given for headache, the cold compresses should be applied to the neck and face.

The hot leg pack should be continued from ten to fifteen minutes, or, if a more prolonged effect is desired, it should be continued eight minutes and then repeated.

For fatigue, aching limbs, rheumatism, sciatica, pneumonia, pelvic congestion, and other diseases, this is a good

treatment. Always follow it with a cold friction, a cold wet towel rub, or a cold wet sheet pack.

177. *Hip Pack.*— This pack extends from the waist line to the middle of the thigh. The method of application is the same as in the hot leg pack, using a blanket wrung out of boiling water for the hot pack, and a sheet similarly folded for the cold pack. Use the hot-water bags in the hot hip pack if possible.

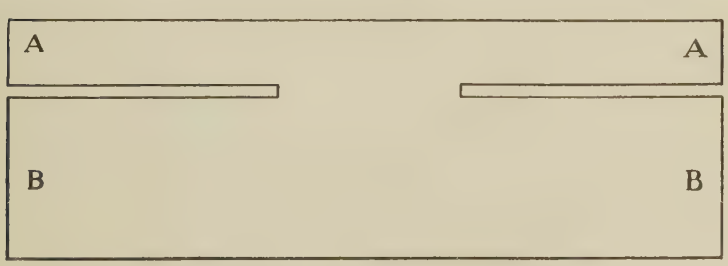


FIG. 61
Hot hip pack, blankets in position

The hip pack should be followed by some cooling treatment. Avoid chilling the body by exposure, otherwise the effect of the treatment will be counteracted.

178. *Chest Pack.*— This pack extends from above the shoulders to the waist. The chest pack is best given cold, and preceded by large fomentations to the chest or back, or both.

For the chest pack, a flannel cloth is necessary, which should be long enough to well overlap the chest. The following diagram shows how it should be cut. The two upper (*a*) strips should be about four inches wide for the adult, and



61a

not cut any farther than the armpit when the patient is lying down. Four thicknesses of cheese-cloth the same shape as the flannel, only a little smaller, are wrung very dry out

of cold water, and spread over the flannel. The patient reclines on this. The strips (*b*) are brought over the chest quickly under the arms, while the strips (*a*) are brought up over the shoulder close to the neck. Then the flannel strips are brought up over the chest in the same manner, only (*a*) should be brought over the shoulder first. The entire pack should fit snugly, and be pinned carefully with safety-pins. Care should be exercised to see that the edges are a tight fit, that no wet surface is exposed, especially about the neck and armpits.



FIG. 62
Hot hip pack, blankets in position

The chest pack may be changed every two hours or allowed to remain on all night.

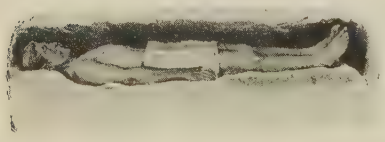


FIG. 63
Cold hip pack

Combined with fomentations it is a most desirable treatment in bronchitis, cough, bronchial irritation, in pneumonia, pleurisy, and tuberculosis. For the cough which accompanies bronchitis, pneumonia, and whooping-cough, in children, it is superior to all known cough sirups.

It must be continually borne in mind that the results to be obtained from this treatment depend largely on the thoroughness with which it is carried out. An exposed border of the wet compress may thwart its intended effect. The chest pack should be preceded by fomentations.

179. *Sponge Bath.*— A pail or pan of water is needed, a sponge, or, bet-

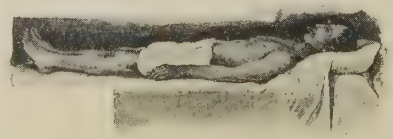


FIG. 64
Cold hip pack

ter, a small towel, and two or three towels for protecting the bed and for drying the patient. For drying the patient, large Turkish or linen towels are best. Begin with one arm, then the other, the chest, the abdomen, the legs, and end with the back, keeping the patient well covered except the part being bathed. The temperature of the water may vary from 60° to 130°, according to the indications.

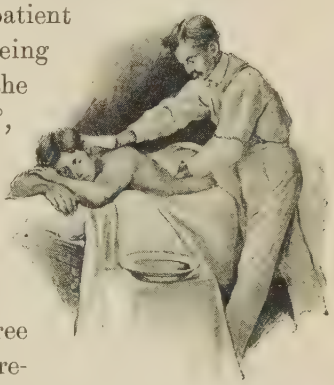


FIG. 65
Cold friction to back, using both hands

180. To give a saline sponge, add a handful of salt to two quarts of water.

181. To give an alcohol sponge, use alcohol one part and water three parts. Only a small quantity is required—a cupful — and use a small sponge.

182. To give a vinegar or witch-hazel rub or sponge, use equal parts of either and water.

183. To give a soda sponge, place one tablespoonful of bicarbonate of soda in a quart of water, either hot or cold, whichever is most agreeable to the patient.

184. *Cold Friction.*—A pail or pan of water is required, and a mitten made from coarse mohair cloth, or from coarse linen toweling. The patient and the bed should be protected with towels or with rubber cloth. Proceed by dipping the mittened hand into the water, while grasping the hand of the patient with the other. Squeezing the water out of the mitten, make a quick sweep from the fingers to the shoulder of the patient and back again, and then very rapid friction, according to the sensitiveness of the

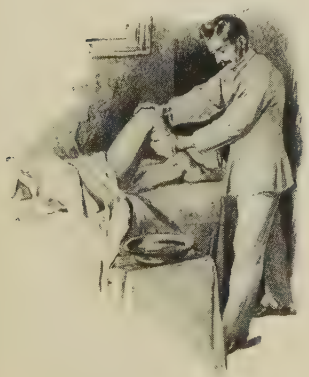


FIG. 66
Cold friction to leg, showing protection of bed and method of procedure

patient. Repeat this twice or three times. Then dry by very brisk rubbing with a coarse towel. Repeat on the other arm, then the chest, abdomen, legs, and back. The entire treatment should not take more than from twelve to fifteen minutes. The effect of this treatment depends mostly upon the briskness with which it is given. Avoid rubbing the abdomen in typhoid fever or appendicitis.

The temperature of the water varies from 45° to 135°. If a patient is too weak to receive a complete treatment, give the friction only to the arms and chest, and gradually take in the whole body.

As a rule, the cold friction is most effective when preceded by some short hot treatment, such as fomentations, or a pack.

Fomentations, followed by cold friction, once, twice, or three times a day, is sufficient to produce a veritable resurrection in many patients.

Friction of any kind should be avoided in all eruptive diseases, or skin diseases.

With those unaccustomed to cold water, or the feeble or aged, it is best to begin at a moderate temperature, say about 80°, and gradually lower it as the reaction power of the patient increases, one degree a day or every other day.

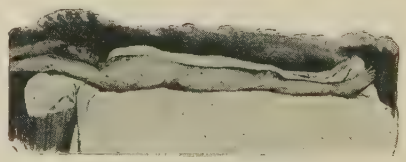


FIG. 67
Wet sheet pack, patient partly covered

185. *Wet Sheet Pack.*— Blankets are required, as arranged in the dry blanket pack, a sheet, and a pail with water at 60° to 75°. Fold the sheet lengthwise, dip it into the water, and wring it dry by twisting. It will require two persons to do this well.

Spread it upon the blankets, and have the disrobed patient lie down on his back and lift the arms above the head. Bring one side of the sheet up over the chest and tuck it in on the other side, and over and around one leg. Lower the

arms, and then bring up the other side of the sheet over the patient, and tuck in securely about the neck and sides. Then wrap him in one or two blankets, according to the desired effect. The shock to the patient passes off in a few seconds. A short hot application before the pack enables the patient to endure it better.

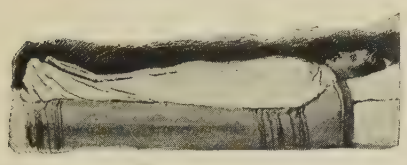


FIG. 68
Wet sheet pack, sheet in position

If given for a tonic effect, it should be continued for ten or fifteen minutes. If for a quieting effect, for half an hour, or even longer, but perspiration should not be induced. This may be avoided by removing some of the blankets.

To produce perspiration, cover the patient well, and continue the pack one or two hours.

To reduce fever, renew the wet sheet as soon as it gets warm, and do not cover the patient very much. Repeat three or four times. If the patient chills, rub the limbs lightly but rapidly.

See that the feet are warm before giving this treatment.

In fever, instead of removing the sheet, it may be sprinkled with cold water, and then covered again.

In giving the wet sheet pack to a fever patient, have him roll to one side of the bed while arranging the blankets and the sheet. Then he can roll back, or be lifted upon the sheet.

186. *Compresses.*— This means applying heat or cold to any particular part of the body. A towel may be used for this purpose, but cheesecloth folded into eight or ten layers is better. As with fomentations, compresses should be larger than the



FIG. 69
Compresses, illustrating application to head, heart, abdomen, and arm

organ over which they are applied. In preparing a hot compress it may be placed in a large towel, dipped into hot water, and then wrung out, thus avoiding burning the hands, and retaining the heat in the compress.

Compresses are named according to the method of application, also according to the region where they are applied.

The most effective compress is one wrung from water between 60° and 70°. As a compress must be renewed frequently, it must be remembered that if the same water is used, the temperature will be altered by each renewal.

Cold compresses, 60° to 70°, should be renewed as soon as they become warm. In fever this will be in a few minutes; otherwise, it takes ten or twenty minutes, the time varying with the thickness and dryness of the compress and the vitality of the patient. The large cold compress is a most efficient means of reducing the temperature, but in such cases it is necessary to cover a large surface. Take a large, thin towel, wring out of water at 70°, and spread over the trunk, and renew as frequently as it warms up. At the same time large compresses may be applied to each leg.

When cold compresses are applied for several hours, as in pneumonia, or in acute sore throat, tonsillitis, or diphtheria, it is best to alternate with a fomentation for five minutes every one or two hours.

If continuous cold compresses cause numbness of the skin, or blueness, apply a fomentation for a few minutes at once, or rub the skin briskly with the hand.

In putting a cold compress on the neck at night for sore throat, cover it with one or two thicknesses of flannel. The edges must be well covered.

The flannel covering a compress must always be wider than the compress.

In putting a cold compress around an inflamed joint, cover it with one or two layers of flannel; and if more heat is required, cover it with a piece of rubber cloth; a piece

of mackintosh, oiled silk, oiled paper, or paraffin paper will do. It is well to do this if a patient is sleeping in a cold room. Put the flannel outside of the impervious covering.

Cold compresses applied to the abdomen in typhoid fever, or acute bowel troubles, should be covered with a loose piece of flannel, and changed every fifteen or twenty minutes, with fomentations every two hours for five or ten minutes. To check vomiting, place a cold compress, wrung out of ice-water if possible, over the stomach, and one across the throat. If vomiting is severe, cover the compress over the stomach with a flannel bandage drawn very tight.

187. *Menthol Compress.*— Get the following at a drug store: Menthol crystals, one ounce; alcohol, one pint. Take a very small portion, and add an equal amount of cold water. Saturate a cheese-cloth compress with this, wring dry, and apply to the throat for colds, to the chest in pain and cough, or about a rheumatic joint. Always cover with a flannel. Protect the edges of the compress well. For headache a compress may be applied without the flannel.

188. *The Wet Abdominal Girdle.*— A strip of linen or two layers of cheese-cloth eight to ten inches wide, and long enough to pass around the body twice, are needed; also a flannel several inches wider and about the same length. This may be covered with oiled silk or rubber cloth.

Wring the compress out of water at about 65°; wring very dry, and apply quickly around the waist. The bandage should extend to the pubes.

It is best to apply the girdle at bedtime, and leave it on till morning. If, after wearing it for several nights, it should cause irritation, leave it off for a few nights.

The edges of the compress should always be drawn tight, and pinned with safety-pins. In women with broad hips and narrow waists, to prevent it from slipping, pass a narrow strip around the thighs, and pin to the girdle. If pinned at the side, take up an extra fold, to prevent slipping.

In case the wet girdle causes chilliness, and does not warm up readily, cover it with another thickness of flannel, or wring it out more thoroughly. A more mild and more local effect can be obtained by placing a cold compress of the same thickness and width over the abdomen only, and covering, as before, with a flannel. There should be two thicknesses of flannel over the abdomen.

189. *Hot and Cold Applications.*— The object of such a treatment is to produce a powerful stimulating effect in a given part.

Alternate hot and cold sponging may be used, or hot and cold compresses, changing every one or two minutes.

In giving hot and cold to the spine apply fomentations for three minutes, and then rub the spine with a piece of ice wrapped in a towel, or with a cold wet towel. Repeat this three or four times at a treatment.

On the foot, leg, or hand, hot and cold water may be poured from a dipper.

For the lower spine, the patient may sit on a stool in a bath-tub, and have first hot and then cold water poured on with a dipper, rubbing it off each time with the hand. In this way the patient can stand hotter water, and a burn is less likely to happen.

190. *The Salt Rub.*— Use the ordinary coarse salt, such as is fed to cattle. Place a pound or more of salt in a basin and just moisten with water. Have the patient stand or sit on a stool in a bath-tub with the feet in warm water. Wet the skin, and then with both hands rub him all over with salt, beginning on the chest and back. The first treatment should be given gently. Wash the salt off with a spray, or by pouring water at 90° to 80° all over him, and then dry with a sheet. This is a most efficient tonic measure.

191. *Douches.*—A syringe is needed, preferably a rubber-bag syringe holding from two to four quarts of water, several feet of rubber tubing, and small and large glass or rubber

tubes, all of which may be obtained at any drug store. Or a syringe may be made by having a plumber put a small tube on the side and at the base of a straight-sided tin pail.

192. The vaginal douche, or vaginal irrigation, is probably the most common form of the douche. The patient should lie upon her back in the bath-tub, or use a douche pan. Use a glass or rubber tube about six inches long, and always direct it downward and backward along the lower vaginal wall. Have the water from one to three feet above the hips.

For simple cleansing purposes, the water should be warm, or about 100°.

To relieve pelvic pain, the water should be from 110° to 115°, and the quantity at least four quarts. In most cases not sufficient water is used.

To re-establish the menstrual periods, use several quarts of water at 103°, and repeat two or three times a day.

To check hemorrhage, use a douche with the water as hot as can be endured, and, as tolerance is established, increase the temperature up to 120° or 125°.

193. For a disinfecting douche use bichlorid of mercury, a $\frac{1}{2000}$ or $\frac{1}{5000}$ solution in water. Or use two teaspoonfuls of a saturated solution of potassium permanganate to a quart of hot water. Or a saturated solution of boric acid may be used.

Except at the menstrual period it is perfectly safe to take a cold douche, or one at 60° to 75°, and it frequently gives relief when the hot will not.

194. *Ear Douche.*— A fountain syringe is needed, or a small hand syringe. If the fountain syringe is used, a small rubber or glass tube with rounded edges should be used. An eye dropper, obtained at any drug store, makes an excellent douche tube for the ear. The ear should be pulled backward and upward, in order to straighten the ear canal. The water, at a temperature of 105° to 110°, should be only a few inches above the level of the ear. If the water is too

warm, it will cause dizziness. A very hot ear douche is apt to make the patient dizzy or faint, so be guarded. If there is faintness, lower the head at once.

To protect the clothing from the water, have the patient hold a small basin firmly against the skin under the ear, or oiled paper may be formed into a trough to carry away the water.

Very great care must be exercised in giving an ear douche. As a rule, it should be given only by a physician or a trained nurse.

195. *The Enema.*—This may be given to empty the bowels, to relieve irritation, to reduce fever, and to give nourishment. A fountain syringe, as mentioned under "Douches," is required, also enema tubes, preferably glass tubes; small tubes should be used for children. The best position is lying on the back or on the left side, but it may be taken sitting on the stool. Where a very thorough action is desired, it is best to assume the knee-chest position, resting on the knees and chest on the floor or on a couch, and gently manipulating the bowels. Sudden pains due to filling the bowels will quickly disappear, also the immediate desire to defecate, if it is resisted. If the water is high above the patient, the force of the water will cause griping pains. An elevation of two feet above the hip is sufficient.

For acute constipation, as in the beginning of fevers, take a thorough enema, temperature 105° to 110°, and repeat if necessary.

For chronic constipation, or where it is necessary to take an enema daily for a few days, the cool enema 70° to 80° is more tonic.

A small enema of ice-water excites vigorous intestinal movements, and is perfectly safe to take.

When the patient is confined to bed, unless there is high fever, the enema should be at 90°.

In high fever, as in pneumonia or typhoid fever, the

enema at 70°, retained for a few minutes, is very efficient in reducing temperature. It may be given every four hours. With high fever, in scarlet fever, the enema at 80° to 90° should be given. A cold enema should not be given to a young child.

In diarrhea that persists, a very hot enema, 110° to 115°, may be given. Not so, however, in typhoid fever. In this case, give an enema at 90° after the stool, or several times a day.

In hemorrhage of the bowels, give an enema of ice-water, also in bleeding piles.

The hot enema may be given in pelvic inflammation. A very hot rectal irrigation, at 125° to 130°, may increase the activity of the kidneys very materially, and aid in the elimination of poisons. Give very slowly. A bowel catheter passed twelve or fifteen inches should be used. This should never be given except on a physician's recommendation.

In dysentery, give either the hot or the cold enema, whichever the patient can tolerate the best. Usually the cold enema is most soothing.

Where a small quantity of water is used, the enema may be resorted to daily, if necessary, without harm.

To give an enema to an infant, the water should be warm. This is much better than giving cathartics.

For very obstinate constipation, with gas in the bowels, give an enema consisting of a quart of warm water, a tablespoonful of soap shavings, and half a teaspoonful of turpentine.

An enema consisting of four ounces of olive-oil may be given. The patient should take it at bedtime, in the knee-chest position.

For pinworms, give an enema of warm water, with three teaspoonfuls of salt to the quart. Or use an ounce of quassia chips boiled in a quart of water. The salt enema will give immediate relief.

196. *Nutritive Enema.*— First give an ordinary warm enema, to cleanse the bowels of all fecal matter. Then, with the patient on his left side, with hips elevated a few inches, a bowel catheter, well lubricated, should be passed very carefully ten to fifteen inches. A tin cup with a small tube soldered to its base or a funnel may be connected directly with the already inserted tube. As a rule, not more than from four to six ounces should be given at a time. Each time it is repeated, the plain enema should precede it.

For the enema give four ounces of milk — better if it is peptonized — and two raw eggs well mixed, with a little salt. Two tablespoonfuls of Horlick's malted milk in the same amount of water may be used with two raw eggs and a little salt. Or use malted nuts. Malted nuts combined with egg is nourishing. Where a patient is fed entirely per rectum, the meal should be given every six hours. Patients have been fed as long as six weeks in this manner.

When a patient can not retain water in the stomach, and thirst is marked, give a quart of warm water with a teaspoonful of salt in it, per rectum, and retain. This will be absorbed and relieve the thirst.

197. *Cabinet Bath.*— This may be improvised in the home by taking a hot foot bath, sitting on a chair, well surrounded with blankets or a comforter. Or, in place of the foot bath, put a lantern under the chair, or an alcohol lamp, and drink hot water or hot lemonade. After free perspiration has been induced, wrap in blankets and go to bed. After an hour, cool off with sponging or friction. Avoid exposure to drafts. It is well to take an oil rub after such treatment.

This is a good treatment to break up a cold at its beginning, and for rheumatism, Bright's disease, and at the beginning of a fever.

198. *Hot-Water Bags.*— These, being of rubber, retain the heat a long time, and may be used in place of fomentations, by surrounding the bag with a moist piece of flannel.

As a rule, moist heat is more effective than dry heat. For backache, toothache, menstrual pains, or pain in the abdomen, the hot-water bag is indispensable.

Most people in filling a hot-water bag put in too much water. Fill the bag about one-third full of boiling water, then press the sides together above the water by holding it against a table, chair, or any object. This will exclude the air and steam. Then screw on the top, so that it will not leak. When placing to the feet, wrap in a flannel cloth. If a patient is unconscious, great care must be exercised to prevent burning. The water should not be over 120°.

199. *The Ice-Bag.*— The short, broad bag is the most serviceable, or the rubber ice-cap is very convenient. Place a piece of ice in a towel, and pound fine with a hammer or stick, and then fill the bag and tie tightly. Wrap in a piece of cheese-cloth or a towel. The ice-bag should not be applied too continuously. After fifteen or twenty minutes, remove it for a few minutes, or rub the skin with the hand to produce a good reaction.

For a rapid heart, as in fever, in organic heart-disease, in palpitation, and in exophthalmic goiter, nothing is better than the ice-bag fifteen minutes from three to six times a day.

200. *Massage.*— Both manual and mechanical movements applied to the body are now generally recognized as indispensable in the treatment of chronic cases. It does not come within the scope of this book, however, to give a description of the various methods and procedures, hence the interested reader is advised to secure a special book devoted to this subject, and make a study of it.

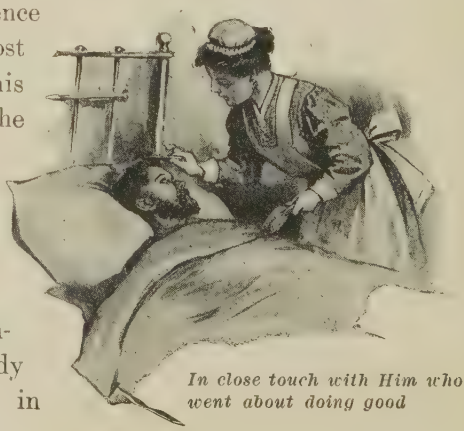
201. *Exercise.*— Work, properly taken, and suited to the individual needs, is one of nature's means of promoting health. Inasmuch as the hygiene of exercise is considered in connection with the physiology of the muscles, no more space need be given to it.

CHAPTER XIX

How to Nurse

202. There is no higher calling than to minister to others, and especially to the helpless. To know something of how to do simple things for the sick is a duty devolving upon every man and woman. By nature woman is a nurse, and is more adapted to nursing the sick than is man.

It is not the purpose of the author to give such information as to make one a qualified trained nurse, but simply to make such suggestions as will be helpful to those who desire to know what to do, and still are not able to take a regular training course. Experience after all is the best and most practical training, and this is to be gained only in the sick room.



In close touch with Him who went about doing good

One who expects to succeed in the profession of nursing should be strong, in good health, self-possessed, gentle, sympathetic, neat, quiet, ready to learn, and, above all, in

close touch with Him of whom it was said that He went about doing good.

Study the preceding and the following chapters carefully, so as to understand the normal working of the body and the nature of the different diseases. This has to be done many times before it is fixed in the mind. Be observing, and your fund of information will be greatly increased. Profit by every mistake.

203. Every individual should study to be quiet, and especially so the nurse. Move quietly and quickly. Do not bump against chairs, slam doors, or rattle windows. Wear rubber heels if possible, for your own comfort as well as for the sake of others.

204. Study every patient's disposition, and know when to talk and when to remain silent. Very sick people would rather not be talked to, except to ascertain their wants. Avoid talking about other serious cases you may know about. Those near the sick should always be hopeful and full of cheer.

205. It is the duty of a nurse to see that the room is cheerful, neat, and in order, properly ventilated, and that the temperature is not over 70°,— better at 60° if the patient has fever. Do not give cold treatment in a cold room.

206. The nurse should see that the bed is made, that the sheets are fresh and kept smooth, and that blankets are well ventilated.

207. To make a bed without removing the patient, roll the patient to one side, push the soiled sheet over, spread a clean sheet in its place, and then roll the patient back, removing the old sheet, and spread the fresh sheet. Some patients may require lifting instead of rolling. It is better for the nurse and better for the patient that two do the lifting, if the patient is an adult.

208. The nurse should attend to the patient's toilet,

changing the night-dress, etc., and see to the preparation of meals if necessary, even to feeding the patient if helpless or weak.

209. Patients confined to the bed with fever can drink best by using a bent glass tube. This saves them the necessity of sitting up, being lifted, and other inconveniences.

210. Patients confined to the bed, especially in fever cases, and following childbirth, should use a bedpan or douche pan, for the movement of the bowels. In order to protect the bed, place a piece of oilcloth, rubber sheeting, or two or three layers of newspaper, under the patient. Remember that the bowels may act slowly in such conditions. In giving an enema to move the bowels, the syringe bag or pail should be but two or three feet above the hips of the patient, so that the water will flow slowly. Lubricate the enema tube with vaselin, soap, or oil. After an enema, the anal region should always be wiped clean and dry, and the parts should never be allowed to remain soiled.

211. If the patient is confined to the bed, a urinal may be used for receiving the urine. This is very convenient, and saves the patient's strength.

212. A nurse should have one or more accurate fever thermometers, and know how to use them. To shake the mercury down, hold the large end of the thermometer by the fingers; give the hand a quick jerk, as in "cracking the fingers." Or, holding the thermometer in the fingers, give it a sudden jar by striking one hand against the other. Before taking the temperature always be sure to shake the mercury down. The normal temperature by mouth is 98.6°.

213. Immediately after use, a thermometer should be disinfected. Use alcohol, two per cent carbolic acid, or two per cent formalin solution. Before taking the temperature, rinse the thermometer in boiled cold water, and rinse again after using.

Temperature may be taken in the mouth by placing the thermometer under the tip of the tongue, the lips being closed. Three minutes is usually sufficient time. Do not take the temperature by mouth within fifteen or twenty minutes after the patient has had either hot or cold water in the mouth, or when the patient breathes through the mouth.

Temperature may be taken in the axilla (armpit). Wipe the region dry with a towel, place the thermometer well up under the arm, and then hold the arm close to the chest and a little forward. It takes five minutes.

Temperature may be taken in the groin, rectum, or vagina. In very young children it is best to take the temperature per rectum, and also in unconscious or delirious patients. Hold the thermometer with the fingers, and give from three to five minutes' time. Remember that the rectal temperature is about one degree higher than in the mouth, so make proper allowance, and always specify this when making a record.

In tubercular patients the best time for taking the temperature is at 8 A. M., 4 P. M., and 8 P. M. In fever patients the temperature should be taken every hour or every two hours. With a mild temperature and the patient in a good condition, this is not necessary.

As a rule, it is wise for a nurse not to tell the patient his temperature, or the pulse rate. It is often stated by ignorant nurses that the patient has no temperature. Such a statement is absurd. If a patient had no temperature, he would be dead. Say he has no fever, or that the temperature is normal.

214. In taking the pulse, practise on yourself until you are sure about a normal pulse. Using the index-finger, or two fingers of the right hand, place them just above the wrist on the thumb side. Always use a watch, and count a minute, or count for twenty seconds, and multiply by three. When the pulse is very rapid, count longer, or repeat two

or three times, to be sure. In children with fever the pulse may be very difficult to count, because it is so high. In such a case it may be necessary to listen over the heart. The pulse may also be taken over the bony ridge just in front of the ear.

The normal pulse in the adult is close to seventy a minute. In a child under one year the pulse is over one hundred, about one hundred fifteen. Up to six years it is close to one hundred a minute. In the adult, with a temperature 100°, the pulse is about eighty or ninety; with a temperature of 102°, the pulse is from one hundred to one hundred ten; temperature 104°, the pulse is from one hundred twenty to one hundred thirty. As a rule, early in tuberculosis the pulse is very rapid.

To count the respirations, count the number of rises of the chest in a minute. The normal in an adult is about eighteen a minute. In a child under one year, about forty.

215. Do not awaken a patient out of sleep to take the temperature, or to give food, medicine, or treatment. If the sleep is disturbed by more or less deliriousness, this rule does not hold.

216. Never allow a patient to have cold feet. No patient, or normal person, can sleep well with cold feet. The best way to warm them is to place them in hot water, 105° to 110°, for five or ten minutes, and rub dry. If in bed, use a wash-bowl or a foot-bath tub. After this, if necessary, they may be kept warm by placing a hot-water bag at the feet, wrapped in a flannel.

Never give a patient a cold treatment when he is cold, chilly, has blue lips, or has goose-flesh. Give fomentations to the spine, a hot foot bath, or a hot friction.

217. Never give a fever patient cold treatment when he is perspiring. Rub him off occasionally with a dry towel, and allow the sweating to continue. If the sweating is a night sweat in tuberculosis, rub dry with a towel, and then give a cold friction, or a hot vinegar rub.

218. In giving water treatments use a water thermometer, so as to be accurate, and do not guess at the temperature. Such a thermometer costs only a few cents. In the absence of a thermometer remember that hot water in which you can hold your elbow will not burn. Bruised tissues have lost their sensibility, and so hot applications may burn without the patient's knowledge. Always bear this in mind.

219. In dealing with infectious cases, such as typhoid fever, diphtheria, tuberculosis, smallpox, pneumonia, scarlet fever, yellow fever, etc., always disinfect the hands after coming in contact with the patient, and before eating. Wash with soap and water and then use carbolic acid solution two per cent, formalin one per cent, or bichlorid of mercury $\frac{1}{1000}$. The last two solutions will make the hands hard and rough. Keep the hands away from the face.

220. In typhoid fever disinfect the stools and the urine. Use chlorid of lime, one pound to four gallons of water, a pint to a quart with each stool, cover, and allow to stand an hour. Bichlorid of mercury $\frac{1}{1000}$ or formalin one per cent may be used. Chlorid of lime is cheapest and safest. Burn the sputa of tubercular and pneumonia patients.

221. At all times be gentle but firm, especially in giving necessary treatment that the patient may not like.

To prepare for examination, have the patient undressed, on a couch or bed, covered with a blanket or sheet to the waist, and over the chest a folded sheet or large towel.

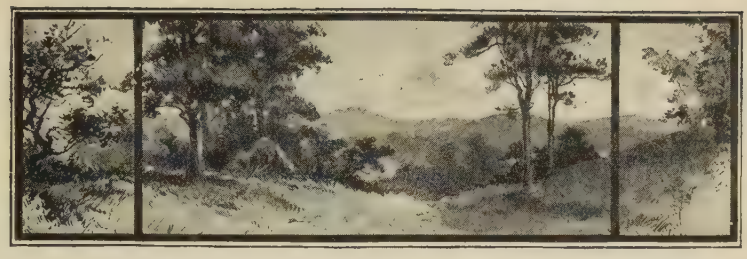
For a vaginal examination, have the knees drawn up, and a sheet wrapped around the legs.

222. When a patient is under the direction of a physician, it is the duty of a nurse to follow out the treatments he suggests, and not give any other treatment except with his ready consent. When a physician has confidence in a nurse, he may give her a great deal of freedom in treating the patient. In any emergency a nurse should do the best she knows how until a physician arrives.

223. A nurse should never criticize the physician in charge before the patient, even if she does not believe in his method of treatment. A wise and skilful nurse can do much to help a physician, especially if she understands hydrotherapy.

224. A nurse should know how to use a hypodermic syringe and how to pass a catheter. Both instruments should be thoroughly disinfected by boiling. Boil the hypodermic needle, see that it fits tight, and is in good order and not rusty. After loading the syringe, hold with the needle upward, and force the plunger up sufficiently to drive out all air. The forearm just below the elbow on the outer side, or the thigh is the best place for making an injection. Disinfect the skin with soap, water, and alcohol, grasp the skin firmly between the thumb and forefinger, and plunge the needle in boldly; inject quickly, remove quickly, and hold the finger over the puncture for a few seconds. If it is necessary to pass a catheter, it should first be washed, and then boiled. Disinfect the hands thoroughly and the parts about the urethra. Do not touch the end of the catheter with the fingers. If necessary, use sterilized gauze. The catheter tip should be lubricated with sterile ointment, and passed gently and without force. For women a glass catheter is best.

225. In dealing either with medical or surgical cases, a nurse should always try to anticipate the wants of a patient, to straighten a pillow, arrange the covers, smooth the sheet, help the patient to a new position, or get a drink. In very many ways a patient may be made comfortable. These little kindnesses, all given in a cheerful manner, will leave a lasting impression. A nurse ought to be wise to see the soul needs of a patient also, and at the proper time to administer efficiently to such needs. Never force an opinion upon a patient, and never argue. It is the duty of a nurse to keep a record of the pulse, temperature, respiration, urine, bowel movements, food, medicine, and any unfavorable signs.



CHAPTER XX

Alcohol

When fruit juice is fresh, it is good for the body. If it is boiled and quickly canned, it will keep sweet for years. But if it is allowed to stand open for two or three days in a warm room, a change takes place in it.

Among other things in the air are tiny plants, called yeast-plants. They can not be seen without a microscope. Some of these little plants are on the outside of fruit. When the juice is pressed out of the fruit, the yeast-plants go into it, and if they are not killed by boiling, they begin to grow, by eating the sugar in the fruit juice. The little yeast-cells are fond of sugar, and grow very rapidly when they can get it.

Every living cell, as it grows and works, throws off waste substances. The yeast-cell forms at least two waste substances. One is a gas called carbon dioxid gas. The gas rises to the top of the juice, forms little bubbles, and passes off. It is the gas in yeast that makes dough rise. The gas is held in by the dough, but as the bread gets warm, the heat expands the gas and pushes the bread up. Then the gas escapes. All the little holes seen in the bread show that the gas was held prisoner for a while.

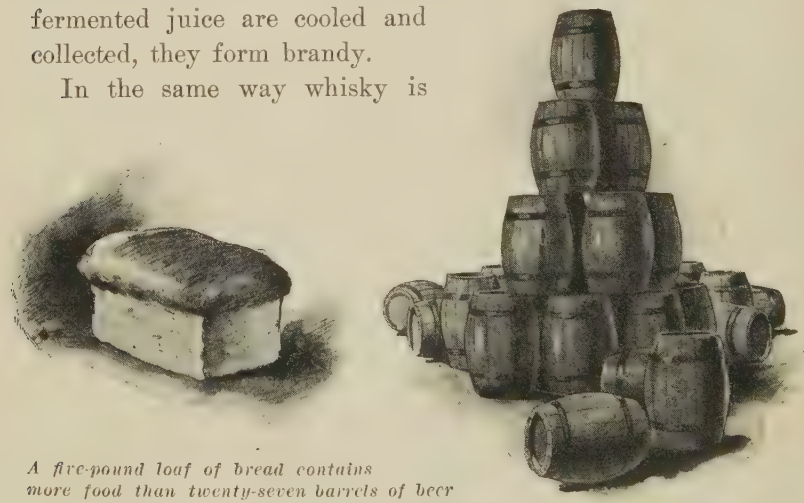
The other waste substance thrown off by yeast-cells is alcohol, and this remains in the fluid. If a large amount of

alcohol is made, it kills the yeast-plant, and then no more is formed. Alcohol is a deadly poison to every living thing.

These two changes produced by the working of the yeast-cells are called fermentation. All such alcoholic drinks are called fermented drinks. Fermented fruit juices are called wines. Beer is made from the fermented juice of grains.

If fermented fruit juice is boiled, the alcohol is driven off. If the vapors driven off from the fermented juice are cooled and collected, they form brandy.

In the same way whisky is made from the fermented juices of corn, rye, and other grains. This process is called distillation. You can distil water by taking a cup of ice-water and holding it close to the spout of a boiling teakettle. Drops of water will collect on the outside of the cup, and run off. This is distilled water.

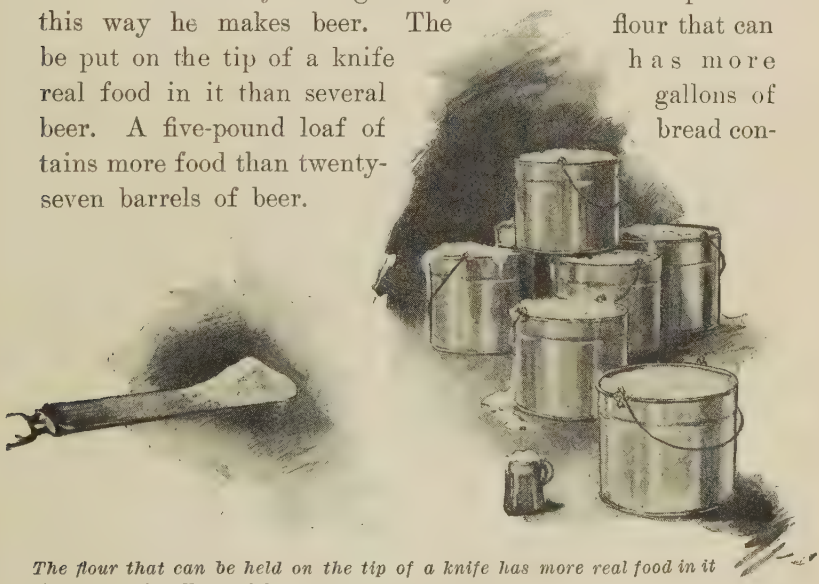


A five-pound loaf of bread contains more food than twenty-seven barrels of beer

Every little kernel of wheat, barley, and rye contains starch and gluten. These are the foods provided by nature for the young plant. Each tiny starch cell is surrounded by gluten. By a beautiful process, part of the gluten is changed into a substance called diastase, that turns the starch into grape-sugar. The grape-sugar is the little rootlet's food.

This is the reason why the roots of sprouting wheat, barley, and rye are sweet.

When the kernel of grain is wet and exposed to a mild temperature, it begins to sprout. The brewer sprouts the grain, and lets it grow for several days. Then he stops its growth by drying it. Next he mashes it, and soaks it in water, to get out all the sugar and diastase. He allows this fluid to ferment by adding to it yeast and hops. In this way he makes beer. The flour that can be put on the tip of a knife has more real food in it than several gallons of beer. A five-pound loaf of bread contains more food than twenty-seven barrels of beer.



The flour that can be held on the tip of a knife has more real food in it than several gallons of beer

One bushel of grain will make about two gallons of whisky.

Alcohol, then, is a waste product of yeast-cells, and acts as a poison to the cells. It is formed only by fermentation. It is never found in nature.

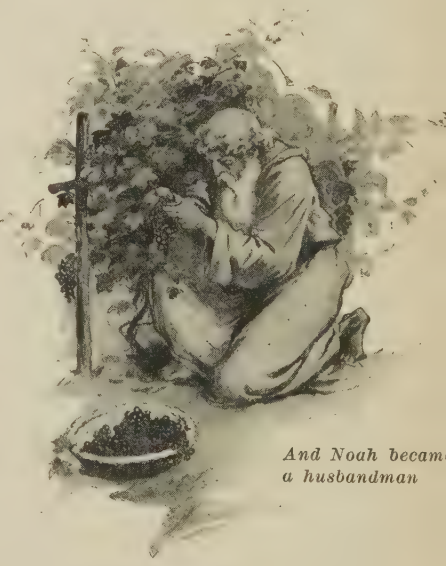
The waste products of any organism that are poisonous to that organism are poisons to all higher forms of life. Hence alcohol is a poison to plants, to animals, and to men.

When fermentation takes place in fruit, the sugar, that gives most of the food value to the fruit, is eaten up by the

yeast-cells, and a poison is left in its stead. When fermentation takes place in grain, the food stored in the grain for the plant and for man, is changed into a poison, that shortens life. So, every alcoholic drink is made at an expense, and works the destruction of natural food.

The first record of the effect of alcohol upon man is this: "And Noah began to be an husbandman, and he planted a vineyard; and he drank of the wine, and was drunken."

Noah, however, probably did not know that sour grape juice would make him drunk, for nothing was understood in those days about alcohol and fermentation. Alcohol was discovered and named about six hundred years ago, by a wise Arabian. He called it *al ghole,* the Arabian word for "evil spirit," because he recognized that when people drank it, it made them act like demons.



And Noah becam a husbandman

In that age men were searching for the fountain of perpetual youth, and the drink that should be the elixir of life. Some thought they had found it in alcohol, and so alcohol was also named *aqua vitæ,* or "water of life." But thousands have learned that it is always the water of death.

Alcohol is the same, an evil spirit, a water of death, whether it is taken in beer, ale, porter, wine, brandy, whisky, cider, rum, or any other drink.

If a little pure alcohol be placed on the skin and covered by a watch crystal, it will blister the skin. Alcohol produces a warm or hot feeling in the mouth and stomach.

An ounce of pure alcohol in the empty stomach of a dog will cause instant death. Beer slows the digestion. Stronger drinks containing alcohol may stop it entirely.

Some people claim that alcohol is a food. But if the little cell workers could tell what they know about it, they would cry out in one mighty chorus: "No, no; alcohol is not a food. It hinders us, deceives us, benumbs us, poisons us, kills us."

Food is changed by the little cell workers into building material. But alcohol can not be changed into living cells. Not only does it resist every effort to make it less harmful, but it also prevents the food from being acted upon easily.

Alcohol circulates in the blood as alcohol. It robs the stream of life of water. It robs the red corpuscles of oxygen. It poisons the little workers of the liver, steals their oxygen, causes more blood to collect there than is good, and, if used habitually, brings a great deal of trouble and sickness to all the little liver cells.

Alcohol paralyzes the nerves that control the blood-vessels. So they become larger than they should be. This is why a man's face is flushed and his skin hot after he has been drinking. By and by the walls of the blood-vessels are so relaxed that they stay that way all the time. Then the veins in the face can be seen, and the nose is always red. But the man is not really warm. His skin is kept warm at the expense of the delicate and important parts of the body inside. It is not the wall of a house that needs to be kept warm, but the rooms and the people within. So it is not the walls of the temple, but the beautiful rooms and the living workers, that need to be kept warm by the blood. All these are endangered by the use of alcohol, for it drives the blood to the surface, where it gives off heat that belongs elsewhere. It makes a man feel warm, and so he is not careful to protect himself against cold. But he needs protection

more than if he had not taken the beer or wine or whisky.

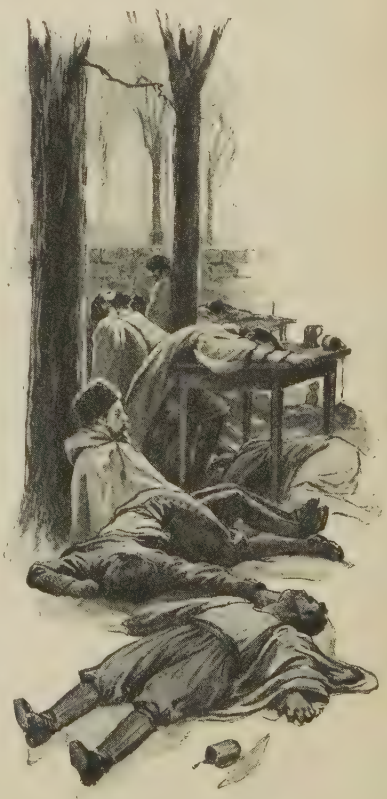
In 1786 Prince Patunkin, prime minister of Russia under the Empress Katarina, gave a state dinner to the peasants. All ate heartily and drank brandy freely. A very cold night set in, and by the next morning sixteen thousand of the drinkers had been frozen to death. The brandy had weakened them instead of protecting them. Lumbermen who work in the woods all winter know that if they drink spirituous liquors they will suffer more from the cold. Arctic explorers who abstain from all alcoholic drinks endure the intense cold better than those who do not.

Alcohol is no better protection against heat than cold. It increases the discomfort and suffering caused by heat, and makes one more likely to have a sunstroke.

The nerve that controls the heart is depressed by alcohol, so that the heart beats more rapidly. At the same time, the force of each heart-beat is lessened, and the walls contract less perfectly.

In the very smallest amounts alcohol has a benumbing effect upon the nerve workers, and on all the little body builders, so that their working capacity is lessened. A man who drinks beer can not shovel as much dirt as a temperate man. A soldier who drinks can not march as well or obey orders as quickly as one who does not.

This terrible enemy of all



Thousands of the drinkers had been frozen to death

the body workers poisons the brain cells very much as opium, ether, and chloroform do. The faculties that are developed latest in life are the first to be injured by it. Self-control gives way, the judgment becomes poor, one becomes talkative and quarrelsome.

Alcohol stupefies the brain cells, and deceives the man. It makes him believe that it helps him to think, but when he becomes sober, he is ashamed of his thoughts. It makes him feel strong, when he is weak; rich, when he is a beggar; happy, when he is miserable; well, when he is sick; warm, when he is cold; active, when he is hardly moving; good, when he is bad. "Wine is a mocker." Large quantities of it will so deceive a man that a chair or table may seem to him a monster. He is close to delirium tremens. "Strong drink is raging." He may commit any crime. "Whosoever is deceived thereby is not wise."

When the habit of drinking has cut a deep pathway through the brain, it holds its victim in bands stronger than iron.

Nobody ever intended to become a drunkard. But it is easy for the little brain workers to form a habit. They learn a good habit as easily as a bad habit. They learn a bad habit as easily as a good habit. If you give them one drink, it is easier to give them a second. If you refuse them the first, there will never be a second. So the old injunction, "Touch not, taste not, handle not," is the very best one to give the little body builders with regard to their terrible enemy, alcohol.



CHAPTER XXI

Tea, Coffee, Tobacco, and Opium

When you drink tea, you are bringing a thief into the body. It goes to every little nerve worker, and robs it of energy.

Every cup of strong tea contains from one and one-half to three grains of caffein, and from eleven to twenty per cent of tannin. Caffein is a poison to the little builders, and tannin hinders the canal workers from digesting food.

Tea is not a food. It has no food value. It is a stimulant, a whip, to every working cell.

After you have used tea a few years, it is plain to be seen that your body workers have been robbed of energy. Your nerve workers have grown weak, and you say you are nervous. Your hands tremble; you have the headache; your heart acts strangely, it beats rapidly; you can not sleep.

When you drink coffee, you are again admitting the same thief. But in coffee there is not nearly so much tannin as in tea. There is more caffein in a pound of tea than in a pound of coffee, but coffee is made so much stronger than tea that the effect on the body is about the same. Coffee contains some fat, but it is indigestible, so that in coffee also there is nothing that can be used in building the body.

Tea and coffee are not only thieves, but liars. When they

get into your stomach, they tell you that you do not need any more food, they are sufficient. They take away your hunger, so that you do not eat enough. You feel braced up by a cup of tea or coffee, because you are deceived. You borrow the strength that belongs to to-morrow, and by and by your bank account of strength is gone.



When you drink tea, you bring a thief into the body

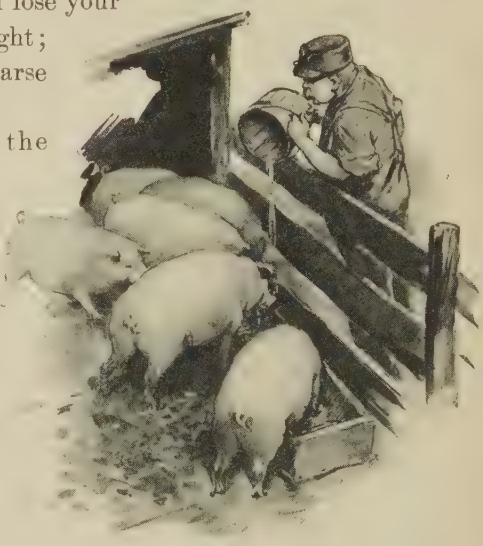
Tobacco is a murderer. It does not rush upon the little workers with a dagger and kill them instantly, but it steals among them secretly and slyly, and poisons them. When tobacco first enters the body, it makes the little workers very sick. The stomach workers try to make it go out again, and very often succeed, sending everything else in the stomach with it. It makes the brain workers dizzy and faint. It makes the muscle workers tremble. It gives you a headache. The cold sweat pours out upon your brow. You heart beats more rapidly. Every little worker in the body is weakened. Its work is almost stopped for a moment.



But if you keep on using tobacco, by and by the little builders will accept it, and try to do their work in spite

of it. Then this wily destroyer has everything his own way. He poisons the canal workers, the liver workers, the muscle workers, especially those in the living fountain, the workers in the breathing rooms, the workers in the living wall, and every little brain and nerve worker. Digestion fails; the liver, the heart, the lungs grow weak; the pores in the skin are stopped; you lose your self-control and love of right; you become selfish and coarse and morally weak.

Smoking injures the throat, weakens the vocal cords, and frequently causes cancer of the lip and throat.



The hogs drank the tobacco water, and twenty-seven of them died

A few years ago I lived near a German farmer who raised tobacco. One autumn after gathering his tobacco crop and washing the leaves, he poured the waste water from the washing into the swill, and fed it to a drove of thirty fat hogs that he expected to sell in a few days. The hogs drank the tobacco water, and soon after became very sick. As a result, twenty-seven of the thirty died.

If you wish to develop a strong body and a pure mind, you must keep this deadly destroyer out of the body. If you smoke cigarettes or chew tobacco, you will be stunted in growth, weakened in lung power, weakened in muscle power, weakened in heart power, and you can not make the building beautiful. Your skin will be sallow, and your expression

faded. You can not keep up with your classes, you can not remember well. You will lose all interest in high ideals, in truth, and nobility.

Thousands of boys are killed every year by cigarettes. Tobacco is always and everywhere a merciless destroyer.

Opium is another deadly enemy to the little cell workers. It is a juice obtained from the unripe heads of the white poppy, a plant of Asia.

Opium contains a poison called morphin, after Morpheus, the god of sleep. Because opium causes stupor and sleep, it is called a narcotic, which means making numb.

Morphin is sometimes given to relieve pain, but it should never be taken if the pain can be endured without it, and never even then except as ordered by a physician.

Pain is the warning of the nerves that there is trouble in the body, trouble that must be relieved, that endangers the life of the little workers. Morphin makes the nerves stop crying, but it does not stop the trouble. The warning ceases, but the inflammation, the congestion, the disease grows worse and worse, until something is done besides giving morphin. Opium causes the nerve-cells to cry out, "Peace and safety," when there is no peace.

Sometimes people find the effect of opium so pleasing and soothing that they keep on taking it after the pain is gone. They keep on drugging the little workers until they are slaves to a master that rules them with cruel and terrible power.

Mothers often give their babies soothing sirups containing opium, to quiet them and to keep them from crying. Nothing is more harmful, even dangerous, to the tender body of a child. This is a practise that has caused the death of thousands of babies and injured hundreds of thousands more. A baby has been known to be killed by one drop of laudanum, a fluid preparation of opium.

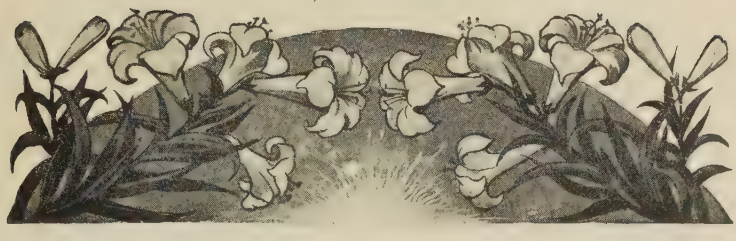
Opium, like alcohol and tobacco, weakens the will power

and changes the entire character. It makes the person using it untruthful, sly, and suspicious.

Knowing the graces and the treasures of the human building, who would let loose within its walls thieves and robbers, murderers and destroyers, to ravage its beautiful rooms, to irritate, deceive, stupefy, and poison its millions of faithful little workers?

To understand the body is to love and to protect it.

PART FOUR



CHAPTER XXII

Diseases

THE SIGNIFICANCE OF FEVER

Fever is not an unmitigated evil, a foe to be annihilated at once. It is, in and of itself, a beneficent manifestation, operating to save the life from destruction.

Twenty-five hundred years ago, Hippocrates, the father of medicine, regarded it as a protective process. This view was lost sight of for centuries, but now there is a tendency among the more progressive to view the meaning of fever in this light.

Fever is an effort on the part of nature to consume the poison and the dross, hence the vital fires are allowed to burn fiercely at times. But, that the fever may not consume everything, nature offers compensation by taking away the appetite, so that no more fuel will be added; by increasing the thirst for water, to aid in quenching the consuming fires; by taking away the strength and putting the patient to bed and at rest; by taking away even the desire to talk and visit; for every movement or exertion increases the fires. Nature is unrelenting, yet she is merciful. She afflicts, but at the same time she works with all her restorative powers, to bring back the harmony and unity destroyed by the raging conflict.

Fever is an elevation of the temperature of the body, and, as a rule, is attended with characteristic symptoms, such as headache, and other aches, rapid full pulse, rapid breathing, a hot dry skin, with flushed face, thirst, loss of appetite, and constipation. As a rule, a fever is not harmful unless the temperature persists above 104.5°. Most of the harmful results attributed to high fever are not due to the fever at all, but to the toxins, or poisons, that cause the fever.

With but very few exceptions, possibly none, fever is due to poisons produced by germs within the body. These poisons are absorbed and taken into the blood, carried to the brain, spinal cord, and nerve centers, and there disturb the equilibrium of the heat-controlling centers. The poisons vary in their action according to the germ producing them. In typhoid fever the poison irritates the brain cells, and hence often causes intense headache and sleeplessness, and, later, dulness. The poison in diphtheria is so very violent that it prevents a high temperature, and soon exhausts the heart and kidneys. In tuberculosis the poison causes a rapid heart in the very early stages of the disease. In pneumonia the poison is of a peculiar nature, causing a great increase in the number of white blood-cells.

As soon as these poisons begin to be formed within the body, the temperature begins to rise; for increased oxidation is going on in the liver, in the lymphatic glands, in the blood, and doubtless in other tissues. The fever is an indication of increased oxidation. If the rise of temperature were prevented, and the formation of poisons continued, death would be very apt to result. In fact, experiments have been performed proving this very point. Chickens and guinea-pigs having been inoculated with malignant germs, were placed in cold water to prevent the temperature from rising. They promptly died. In others the fever was allowed to rise several degrees, and all lived. Nature attempts to combat all poisons with an increase of heat production.

In all fevers which attend such an increase in heat production, the blood elaborates an antitoxin, which tends to counteract the effect of the poison produced. Hence it is obvious that fever is a protection against infection.

Viewing fever from this standpoint, it is clearly to be seen that to rapidly reduce fever with such drugs as quinin, antipyrin, phenacetin, and other coal-tar preparations, is not only unphysiological and unscientific, but it does positive harm to the patient, lessening the chance for recovery. Many cases of heart failure and of nervous disorders can be directly traced to the extensive employment of these so-called antipyretic (to reduce fever) drugs in *la grippe* a few years ago. To break up fevers with these drugs is positively dangerous.

No doubt, then, the question naturally arises to many, Is it not harmful to use cold water or ice in fever, and in trying to reduce the temperature?

The answer must be, No, and for this reason: cold, when brought in contact with the skin, not only abstracts heat from the body, and hence lowers the temperature, externally at least, but through its effect upon the nervous system the nerve centers are energized; the liver and all glandular organs are stimulated to increased activity — which all means increased oxidation, or the breaking up of poisons, and their elimination through a better action on the part of the kidneys. If the cold bathing simply depressed the heat-producing centers, and had no effect on the poisons, then it would be harmful, the same as antipyretic drugs. This is the whole philosophy of the use of hot and cold treatments in fever. Give treatment to remove the poisons, and the fever will take care of itself, or, more plainly, there will be no fever.

Since looking at it from this position, I have never been an advocate of the plan to deluge a patient all day and night with cold water, cold packs, compresses, tub baths,

and hot applications, simply because the temperature was 104°, and persisted at that point. Many typhoid and pneumonia patients have thus been treated much to their disadvantage. The fever is not the crying evil. The poisons are doing the mischief. When I am treating a case of fever, it is the amount of poison that concerns me, and not the fever. If the production of poisons can be reduced, and good elimination secured, the fever need give little concern.

This leads to another point concerning fevers, on which there is much misunderstanding, and that is breaking up fevers. There is a very popular notion that typhoid fever and pneumonia can be broken up if only the right medicines are taken. And in every town there are certain learned and skilled(?) physicians who profess to be able to do just that sort of business. My observation leads me to believe that such physicians have to sign a great many death certificates. Then our homeopathic brother often carries a little pill that will check smallpox in its mad career, and abort scarlet fever by the third day. This is all medical nonsense, and worse than that; it deceives the people. When a physician makes the claim that he can break up typhoid fever, it at once shows that he knows but little about the real nature of the disease.

As a matter of fact, typhoid fever has had a start of from one to two weeks before fever and other symptoms of any degree appear. During all this time the germs have been incubating and getting a foothold. When the fever begins to appear, it indicates that the germs are producing enough poison to affect the heat-controlling centers. One might just as well claim to break up scarlet fever or yellow fever after it has once started.

However, typhoid fever or pneumonia that begins with severe symptoms, and gives all indications of running a severe course, may be converted into a mild form of the disease, and run a shorter course, by withholding all food for

several days, and securing thorough elimination from the bowels, the kidneys, and the skin.

So fever is not a dangerous foe, to be attacked with the "hammer-and-tong" method, but it is a protective process, healing in its nature, and at work to save the body from the ravages of infection. The fierceness of the fever will depend upon the vital resistance of the patient, his susceptibility to the disease, the amount of dross present, and the virulence of the infection.

ACUTE INFECTIOUS DISEASES

The distinctive triumphs of the past century in preventive medicine are trophies of which the world as well as the medical profession may well be proud. In civilized countries the causes of disease are no longer regarded as supernatural manifestations of the wrath of the Almighty, hurled for personal vengeance upon individuals, cities, and nations, but are looked upon as simple natural influences, having a natural origin and producing a natural sequence, namely, disease. Epidemics, diseases, and deaths that two centuries ago were attributed to witchcraft, evil spirits, the evil eye, that were in consequence to be warded off by incantations, magic spells, and amulets, are now known, even by the laity, to be the result of natural morbific agencies originating in the violation of natural law. However, superstition and ignorance have not altogether vanished. Even to-day thousands of deaths that were preventable are accredited to Providence, whereas they are in reality directly due to ignorance, neglect, and squalor. While epidemics resulting from filth no longer terrorize civilized nations as they formerly did, the prevalence of many diseases resulting from high living, errors in diet, lack of exercise, and high nervous tension, is steadily increasing. Hence the sanitarian of to-day, while taking courage from the victories of the past, must also take warning from the evils that remain.

Most of the diseases that afflict the human race to-day are preventable. While certain of the acute epidemic diseases have been checked in their progress and robbed of their horrors, nevertheless, we are confronted with the fact that pneumonia, diphtheria, cancer, insanity, and all of the chronic diseases, are on the increase.

Errors in diet, overeating, the common use of alcoholic drinks, tea, coffee, and tobacco, errors in dress, sexual excesses, the unreasonable demands of society, the mad rush for position and wealth, with the attending train of evils, are prolific sources of disease. The vital resistance is so lowered by these excesses that the body becomes the prey to every ill. The storm-center of disease is within and not without the body.

In the following pages the causes of disease and the symptoms are expressed in the briefest manner possible, no attempt being made to round out sentences. Much more might be said on every single phase of the different diseases, and that with profit and interest, but enough has been said to make each disease clear and distinct. As a rule, only such treatment has been suggested as can be given in the home.

The numerals in connection with the different treatments refer to the paragraphs in preceding chapters where the method of giving the treatment is described.

TYPHOID FEVER

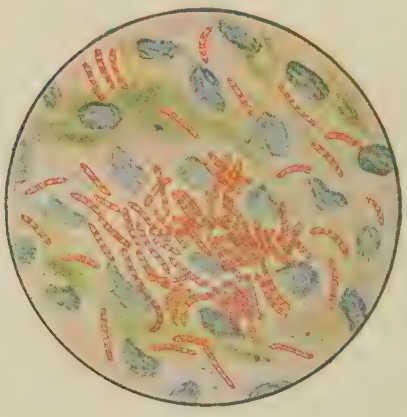
Synonyms.— Enteric fever, autumnal fever, typhus abdominalis, nervous fever.

Typhoid fever is an acute infectious disease, caused by a special germ, characterized by a high continuous fever, headache, abdominal distention and tenderness, constipation or diarrhea, and a rose-colored eruption appearing on the abdomen and trunk.

Causes.— The predisposing causes are impaired digestion, intestinal weakness, errors in diet, oysters, ice-cream, filth,



Germs of Typhoid Fever



Germs of Tuberculosis

PLATE VIII

unhygienic surroundings, physical exhaustion, overwork, autumn season, early adult life, occurring most commonly under thirty years of age. It is not common in young children. It may occur in the extremely young or aged. Personal susceptibility seems to figure in this disease, for all exposed to infection do not contract it.

Exciting Causes.— A special germ called the *bacillus typhosus,* discovered by Eberth. Drinking water, food, or milk that has been contaminated by intestinal discharges. Contaminated water is the most frequent medium for carrying the infection. Typhoid fever due to drinking milk is primarily due to polluted water which has been used in washing the udders of the cow or in cleansing the milk cans.

Symptoms.— *General.*— A gradual onset, weariness, indisposition to exertion, headache, pains in different parts of the body, nosebleed, fever increasing each day until the temperature rises to 103° or 104° by the tenth day, varying but little for ten days, the evening temperature being one or two degrees higher than in the morning. About the end of the third week the fever begins to subside, which takes another week or ten days. Loss of appetite, heavily coated tongue, or it may be dry, brown, or cracked, with a collection of food, tartar, germs, and epithelial cells, called *sordes,* on the teeth. As a rule, the bowels are loose, though constipation is present in many cases. The discharges vary from three to six a day in number, are thin, offensive, and of a yellowish color. There is distention of the abdominal wall, marked tenderness on pressure, rumbling of gas in the intestines. Cough is common.

Circulatory Symptoms.— The pulse increases in proportion to the fever. It is rapid, about one hundred, and full in volume. During the second week it becomes weak and more rapid.

Nervous Symptoms.— Headache, first week, followed in the second week by mental dulness, stupor, muttering delir-

ium, picking at the bedclothes. During the height of the fever, the patient may try to get out of bed and jump from a window.

Face.—The cheeks may be flushed the first week; later the face has a peculiar pallor; the countenance is dull and expressionless.

Skin.— A rose-colored rash appears from the seventh to the tenth day, usually first on the abdomen, then on the chest or back. It comes out in crops, each crop lasting about forty-eight hours. Often there are only one or two very small spots. Each spot is rose-red in color, and disappears on pressure. At the height of the fever the skin is usually dry. Sweating is the exception.

Serious Symptoms.— Fever above 104.5, early involvement of the nervous system, muttering delirium, with tremor, hemorrhage from the bowels, perforation of the intestine, producing general peritonitis. Hemorrhage occurs in about three per cent of cases, and is indicated by a very rapid pulse and a sudden fall of temperature, followed by dark discharges. Perforation is indicated by a sudden pain and fall of temperature, followed by a diffuse pain in the abdomen. At times sudden death takes place, without much warning, and without a known cause.

Many cases of typhoid fever run a short course of from twelve to fourteen days instead of three or four weeks. A relapse is common in such cases.

Treatment.— 1. *Preventive.*— This means the adoption of such measures as will enable one to live above disease and sickness; carefulness in diet and in habits of life; good sanitary and hygienic surroundings. "The prevalence of typhoid is directly proportionate to the inefficiency of the drainage and water supply of a town or city." Every article that is used in connection with a typhoid patient must be subjected to the most rigid methods of disinfection. All drinking water and milk should be boiled.

2. *General.*— Professor Osler, in speaking of the general management of typhoid fever, says, "Careful nursing and a regulated diet are the essentials in a majority of the cases." He further says, "The profession was long in learning that typhoid fever is not a disease to be treated by medicine."

The room in which the patient is placed should be well ventilated, and contain but few articles of furniture; the bed should preferably be single.

At the very beginning of the disease the patient should go to bed, and not even sit up. The bedpan and urinal should be used. By means of a bent glass tube the patient can drink water or other fluids without changing his position, except to the sides.

After eating, the patient should cleanse the mouth and teeth with lemon-juice, or with cinnamon water, fifteen drops of the oil of cinnamon in a glass of water.

3. *Diet.*— In the beginning of typhoid fever, a fast for from twenty-four to thirty-six hours, or longer, would do much to mitigate the devastating influences of the disease. Abstaining from food for a few days, taking nothing but fresh unsweetened fruit juice, or eating fresh fruits, as peaches, baked apples, plums, pineapples, etc., will do much to remove poison from the intestines and reduce the fever. If fruits cause any fermentation, avoid them. The tendency is to overfeed in typhoid fever. Such food should be selected as will sustain the patient, be quickly and easily digested, leave but little residue in the intestines, and that will not tend to increase the growth of germs. Such a diet is found in fruits, without seeds or skins, fruit juices without sugar; light gruels, such as oatmeal, farina, or gluten, and zwieback, or thoroughly toasted bread. The juice of lemons, oranges, limes, blackberries, raspberries, and grapes, all without sugar, scraped apple, baked apple, may be used with good results. Avoid sugar in fruit juice. The acid juices are disinfectant, and tend to diminish bacterial

growth in the small intestine,— the seat of the disease. Milk is considered by many as the best diet in fever. If used, from two to four pints all told should be given an adult at stated intervals during the twenty-four hours. The milk may be diluted with water (boiled), one-fourth lime-water, or with carbonated water. When a patient is given a milk diet, the stools should be watched carefully for any undigested curds. Koumiss or buttermilk is in many ways superior to sweet milk, and many can take either of these when the ordinary milk is distasteful. The patient should drink freely of cold but not ice-water, but should not be awakened out of sleep to take medicine, food, or drink. However, in prolonged stupor it may be necessary to arouse the patient for food at regular intervals. When milk is given as a diet, fruits should not be used at the same time. As a rule, typhoid fever patients are fed much too often.

4. *Baths.*— *a.* Sponging the patient with ice-water, accompanied with friction, every hour or every two hours, is one of the most efficient means of reducing the fever and making the patient comfortable, at the same time applying ice compresses to the head. (See No. 186.)

b. The cold wet sheet pack is another excellent method of combating the effects of high fever. This may be rendered still more efficient by sprinkling cold water on the sheet, and allowing it to evaporate. If the patient objects to the cold, a hot bag to the spine may be applied at the same time. (See No. 185.)

c. Cold water drinking. (See No. 169.)

d. A moist abdominal bandage at night. (See No. 188.) Cold or ice compresses to the abdomen during the day, alternating every two hours with fomentations for fifteen minutes. (See Nos. 186 and 170.)

e. By means of rubber sheeting on a suitable frame an apparatus may be improvised so that a full bath may be given without greatly disturbing the patient. The regular full

bath is not practical for the home unless given by trained attendants.

f. From the beginning of the disease it is well to apply the ice-bag (see No. 199) or very cold compresses (see No. 186) over the heart fifteen or twenty minutes three or four times a day. This will reduce the temperature, strengthen the heart, and make the patient very much more comfortable.

g. For severe headache and sleeplessness, apply a cold compress to the scalp after wetting the hair, also to the neck, and give a hot foot bath for six minutes. (See Nos. 186 and 171.)

h. If cold treatments make the patient chill, give hot friction at 130°. This may be more effective than the cold.

i. The cold enema, 70° to 80°, three or four times a day may be necessary when the temperature is high. However, great care should be taken to disturb the patient as little as possible. If the patient perspires, avoid any cold treatment. (See No. 195.)

j. Keep the sheets smooth, and change the position of the patient frequently. If there is a tendency to tenderness of the skin over the lower spine, or over bony parts, give alternate hot and cold (see No. 189), and then rub with alcohol (see No. 181) several times a day. If there is a bed-sore, cleanse with boric acid solution, cover with white of egg, and make a cushion to keep the parts off the bed.

If cough is troublesome, give fomentations to the chest ten minutes, and follow with cold compress at 60°, covering with a flannel, changing every twenty minutes for one hour. (See Nos. 170 and 186.)

Several different treatments have been given here for typhoid fever, to meet the varying conditions, but it rarely happens that more than three or four distinct lines of treatment need be employed, if there are no complications. All treatments should be as simple as possible, and the patient should not be disturbed any more than absolutely necessary.

Most cases can be well cared for by simple cold sponging, the ice-bag or cold compresses over the heart, cold compresses over the abdomen, and the cool enema.

If a patient does not do well with the enema, or it is impossible to give it, give a dessert-spoonful of castor-oil early every morning.

5. *Disinfection.*— The discharges may be best rendered innocuous by the following plan: Dissolve a pound of chlorid of lime in four gallons of water, and add a quart of this solution to each discharge, allowing it to remain in the vessel one hour. All soiled bedclothes and garments should be thoroughly boiled, and care exercised in keeping scrupulously clean all dishes used.

Excessive pain in the bowels will be relieved by fomentations. (See No. 170).

Intestinal Hemorrhage.— Absolute rest and ice-bag on right side, with heat to the legs. (See No. 199.)

6. *Convalescence.*— During this period the patient develops a ravenous appetite, and sympathizing friends are only too willing to gratify it. A patient should not eat solid food until the temperature has been normal for ten days. Meats should not be allowed, nor eggs until after the first week. If there is a tendency to constipation during convalescence, it may be relieved by an enema. Any excitement, either mental or physical, must be carefully avoided.

CEREBROSPINAL FEVER

Synonyms.— Epidemic cerebrospinal meningitis, spotted fever.

This is a disease in which the membranes of the brain and spinal cord are inflamed. It is characterized by intense pain in the head and limbs, vomiting, convulsions, and very irregular fever, and at times a peculiar eruption.

Causes.— It is most prevalent in northern regions of the temperate zone. It may occur in isolated cases or in epi-

demics, and is most common in winter. Bad hygienic conditions, as exposure, overcrowding, insufficient food, foul air, bad drinking water, excessive mental and bodily exertion, alcoholism, tobacco, and age, are all predisposing causes. The exciting cause is a micro-organism. It may follow pneumonia or occur during an attack of pneumonia.

Symptoms.— Onset is sudden. Attack nearly always begins between noon and midnight; chills, violent headache, repeated vomiting, moderate fever, great pain in the head, back, and limbs, great pain on pressure over the spinal column and along the nerves. Second day, muscles of the back become stiff, head is drawn back or to one side, body may be arched, headache increases, also sensitiveness to light and sound, irritability and restlessness, arms and legs may be flexed, delirium, stupor, unconsciousness, tremor of the eyeball, the eyes diverge or converge, the eyelid may droop, unequal pupils, partial deafness or blindness, fear of light, coated tongue, loss of appetite, constipation, retraction of the abdomen, extreme sensitiveness of the skin, small blisters about the lips, a peculiar rash that often does not disappear on pressure. The temperature is rarely above 103°, and is very irregular, the pulse rapid and full. The duration of the disease may be from a few hours to several months. The first week of this disease is the time of greatest danger. Those who live until the close of the second week will probably recover. The mortality is from twenty to eighty per cent.

Unfavorable Symptoms.— Abrupt and violent onset, very high fever, convulsions, unconsciousness, great prostration, irregular respiration, persistent vomiting.

Treatment.— Room should be dark and quiet. Give a liquid or fruit diet, and water freely at all times. Cold applied to the head and spine is the most efficient treatment. (See Nos. 186, 199.) It should be applied continuously in the form of ice-bags to the head or spine, alternating with a

short hot compress or fomentation once or twice an hour. (See Nos. 170, 186, 199.) During a convulsion, place the patient in a warm full bath, 98°, and keep cold to the head and neck. It is well to have the water ready for immediate use. In place of the warm bath, a warm pack may be given for thirty minutes at a time. Cracked ice placed between two towels may be applied about the head, especially to the back of the head. Cold is very useful to alleviate the pain in the first stages when it is at its worst. (See Nos. 173, 186, 185.) It also produces sleep. Cold baths, cold affusions, or cold sponging will reduce the fever and make the patient as comfortable as possible. Along with the cold application to the head, the hot foot bath, hot mustard foot pack, the hot leg pack (see Nos. 171, 176), or hot bottles, bricks, or sand bags to the lower extremities, will mitigate some of the violent symptoms, and relieve the congestion of the brain and spinal cord. This combined treatment will also prevent any depressing effects of cold.

When the acute symptoms have disappeared, it is then necessary to begin systematic treatment. Rigid dietetics is necessary, avoiding meat, eggs, tea, coffee, and pastries. Electricity, hydrotherapy, massage, and hygiene are of special value. The patient is likely to make slow recovery.

INFLUENZA

Synonyms.— *La grippe,* grip, catarrhal fever, epidemic catarrh, Chinese, Russian, and Spanish catarrh.

This is an acute infectious disease, epidemic, moderately contagious, characterized by catarrhal inflammation of the mucous membranes, fever, muscular pains, and pain in the back and head, great prostration, running a short and favorable course, but is often attended by serious complications.

Causes.— Occurs in epidemics, beginning in Russia and spreading rapidly westward along lines of commerce. The disease was most marked in this country in 1890–92. Low-

ered vitality, absorption of poisons from the alimentary canal, loss of sleep, lack of exercise, exposure to wet and cold, are predisposing causes. The exciting cause is a small germ discovered by Pfeiffer in 1892. The aged and infirm, and those of a nervous temperament, are most susceptible to the disease.

Symptoms.— Sudden onset, with chill of moderate severity; fever, which comes on quickly and rises to about 103°; headache; pain in the back and limbs; a sore feeling, as if bruised; restlessness; often marked prostration; the eyelids are red; sneezing, hoarseness, and hard cough. At times the disease attacks the nose, throat, and lungs, then again it may assume the gastro-intestinal form, or it may be neuralgic in type, characterized by pains in the head, back, and limbs, and pains in the bones.

La grippe may be complicated by pneumonia, inflammation of the kidneys, inflammation of the nerves, fatty degeneration of the heart, or insanity. Persistent headache, insomnia, neuralgia, and enlargement of the glands of the neck, may follow this disease. In the aged and debilitated the disease is a grave one, and frequently proves fatal.

Treatment.— Rest in bed, fruit diet, and light gruels. Rest must be insisted upon. Avoid drafts and purgatives. If this disease is taken in time it may be aborted. The treatment of *la grippe* should be vigorous. Begin at once. Insist, first, on absolute rest; second, relieve the congestion of the mucous membrane of the nose and respiratory tract, also of the brain and its coverings. This is best accomplished in the following way: (1) Take a large enema, with the water at 110°, and thoroughly cleanse the bowels. (2) Place the feet and legs in some vessel so that the water will come up nearly to the knees; have the water as hot as can be endured, and keep adding hot water, so that the bath may be kept constantly hot. Continue this for twenty minutes, and at the same time drink freely of hot

water or of hot lemonade. While taking this treatment, apply a compress (see No. 186) wrung out of ice-water, to the entire head. This treatment should be continued until the patient perspires freely. If the hot leg bath is not convenient, give a hot leg pack (see No. 176), apply cold to the head (see No. 186), and continue until the patient perspires. After either of these treatments, the patient should be put to bed, and kept warm, in a cool room, with good ventilation.

During succeeding days if the pain continues, give a hot blanket pack fifteen minutes, followed by cold friction, and fomentations to the spine two or three times a day. If there is cough, and the lungs are sore, give fomentations fifteen minutes, followed by the chest pack, changing every two hours. Keep in bed as long as the fever, soreness, and exhaustion continue. (See Nos. 175, 184, 170, 178.)

SCARLET FEVER

Synonym.— Scarlatina.

This is an acute contagious, infectious disease, characterized by a high fever, rapid pulse, a diffuse scarlet rash, and, as a rule, marked throat symptoms.

This disease is rare in Asia and Africa, and is said to be unknown in Japan, and is less disseminated than either measles or smallpox. Scarlet fever varies in intensity, at times being mild in form, then again appearing in its most malignant and virulent character. Since smallpox has been shorn of its terrors, scarlet fever takes rank as one of the most dreaded of the infectious diseases.

Causes.— It occurs most commonly between two and seven years of age. A second attack is rare. The contagion is usually carried by clothes, food, milk, bedding, books, letters, toys, rugs, cats, and dogs; it may be carried by the hands, or the hair. The disease is most contagious during the stage



Measles



Scarlet Fever

PLATE IX

of scaling, while measles is most infectious in its first stage. Incubation is a few hours to seven days.

Symptoms.— There are several varieties of scarlet fever, but for simplicity's sake we will give only the important symptoms consecutively.

The beginning is usually sudden and violent. Grave or even fatal illness may develop in a few hours. There is usually a chill or a series of chills, vomiting as a rule, sometimes convulsions; fever rises quickly to 104° or 105° in a day or two, remaining uniform for three or four days, and then falls slowly, pulse being very rapid, the duration of the fever being from seven to ten days. Swallowing is difficult and painful; the glands in the neck are enlarged and tender; the tongue is coated white, studded with red spots, and because of its resemblance to a strawberry is called "strawberry tongue." Loss of appetite, constipation, and a scanty urine, often highly colored and containing much sediment, are symptoms of this disease.

The Eruption.— The rash is scarlet-red, and appears at the end of the first day, or on the second day, on the neck, chest, and face. It spreads rapidly all over the body, and disappears in the same order, by desquamation, or a peeling off of the skin. Sometimes a cast of the palm of the hand or sole of the foot is given off. The desquamation begins about the sixth day. In the majority of cases the scarlet color first appears on the tonsils and throat. This is often overlooked.

Complications.— Inflammation of the middle ear; inflammation of the kidney, which is very serious, and must be carefully watched; heart-disease; inflamed glands; chorea.

Prognosis.— The mortality is five to forty-four per cent.

Treatment.— In considering the treatment of this disease, Professor Rotch, of Harvard, says: "In my opinion drugs are employed to entirely too great an extent in a large proportion of the uncomplicated cases of the benign type of scarlet fever. I feel that I can speak with some

authority on this point, as it has been my rule for years to compare the results of cases treated by my colleagues with drugs, with my own cases treated without drugs." Scarlet fever is a self-limited disease, and can not be cut short.

The child should be isolated from the rest of the family, and no visitors allowed. Sunny room, good ventilation, all unnecessary things removed. Absolute rest in bed. Fruit or liquid diet. (See under Typhoid Fever.) Hot treatment — a hot bath, hot sponging, a hot pack, or a wet sheet pack continued for one hour (see Nos. 173, 179, 185)— will bring out the rash; cold treatment will delay the eruption. Hold cracked ice in the mouth for sore throat and for vomiting. If possible, the patient should gargle cold water, or the following solution, every two hours: Carbolic acid, one dram; listerine, one ounce; a teaspoonful in half a glass of water. If the child is too young to gargle, cleanse the throat with swabs of absorbent cotton, using the solution given above. Burn all swabs after using. Peroxid of hydrogen, one part to five parts of water, makes a good gargle.

Apply cold compresses to the throat, changing every fifteen minutes, for one hour, and fomentations ten minutes, four times a day; reduce the temperature by cool sponging, by the cold pack, by the graduated bath, in all cases adapting the temperature to the individual conditions. (See Nos. 179, 185.) After the rash appears completely, the surface of the body should be anointed two or three times a day with cocoa butter, carbolized vaselin, or olive-oil. This will soften the disintegrating epithelium, lessen its duration, and prevent the spread of the disease by means of loosened scales. Move the bowels by the enema at 90° daily. If the child is eight or ten years old, the water may be 80°. (See No. 195.) The child should be kept in bed until the scaling is well advanced. This will cover a period of four or five weeks. The scaling will be hastened by a warm bath and

soap shampoo every night. Do not begin this until all traces of the fever have left. Indiscretion in diet, such as eating meat or very hearty foods, during convalescence, and over-activity, may result in acute Bright's disease or organic heart-disease. It is well to keep the child indoors for several weeks if the weather is cold or damp.

Inflammation of the ear is best treated by a hot douche, 105°, and then applying dry heat. I have never seen ear complications arise when the gargle was used faithfully, and the child avoided blowing the nose. (See No. 194.)

Disinfection.— The greatest care must be taken to disinfect the clothes soiled or used, and all dishes used. When the child is well, it should be thoroughly sponged with a solution of corrosive sublimate, ʒ0$^{1}_{0}$0, then immediately with water, to avoid any irritation of the skin. All clothes should be boiled, and the room disinfected by burning three pounds of sulphur to every one thousand cubic feet of space, after closing up all cracks and crevices. Or the ceiling, the walls, the woodwork, and the furniture may be thoroughly rubbed with bread, and then wiped with the corrosive sublimate solution, ʒ$^{1}_{0}$0.

The spread of this disease may be prevented by disinfection. Formaldehyd is now used for fumigating rooms.

MEASLES

Synonyms.— Rubeola, morbilli.

This is one of the most common diseases of childhood, and was first described by Ahrún, a Christian priest and physician of Alexandria, in 610 A. D. It prevails in epidemics in Europe, Asia, North and South America, and the islands of the sea. Epidemics of measles die out in two or three months for want of material. Measles is very uniform in its signs, symptoms, course, and complications, and is not to be feared as is scarlet fever, although measles has nearly depopulated aboriginal tribes when first introduced by travelers.

Causes.— The poison is transmitted by means of clothes or through the air, for it is very diffusible. Measles, like *la grippe* and other infectious diseases, respects nothing but sanitation and sound health. Dirt, filth, lack of sunshine, poor ventilation, poor blood,— all favor and encourage the spread of the disease. The infection is associated with the nasal and bronchial secretions, hence it is most infectious in the beginning of the attack, and the infection may be transmitted three or four days before the eruption begins. Measles occurs most commonly between one and five years of age. As a rule, measles attacks but once.

The incubation, or lapse of time between exposure and the appearance of the first symptoms, is fourteen days.

Symptoms.— Chilliness, sneezing, increased nasal secretions, watering of the eyes; eyelids are red, light is painful; cough, expectoration, nosebleed; child is feverish, drowsy, listless, fretful; the temperature rises to 100° or 103° until the second day, when it may drop nearly to normal, and then it rapidly rises again to 102° or 104° during the eruption. It remains high for two or three days, and then rapidly subsides in a few hours. There is headache, pain in the back and limbs, coated tongue, dry lips, loss of appetite, at times nausea and vomiting, constipation; the glands in the neck are enlarged, and often the bronchial disturbances are very marked.

The Eruption.— This usually appears on the morning of the fourth day, but it may occur on the third or fifth day. It manifests itself in spots (measles) about the size of a pin-head, slightly elevated, dark red or tinged with blue, first showing itself above the temples, near the ears, or on the chin and face, then spreading rapidly all over the body. These little spots run together and form crescents.

The eruption in measles usually appears first on the mucous membrane of the mouth in the form of bluish-white specks on a red background. These are called " Koplik's

sign." These spots appear a day or two before the red spots mentioned above, and are first seen opposite the molar teeth.

The tendency of the eruption in measles is to form blotches. In two or three days the eruption begins to fade, and the outer skin comes off in small, branny scales. During the desquamation there is little if any fever. In black measles there is a hemorrhagic condition of the skin and mucous membrane. This form is attended with great prostration.

The course of measles is as follows, if uncomplicated: Ten to fourteen days, incubation; three days, invasion; three days of progress, and three days of decline.

Complications.— Catarrhal pneumonia, croupous pneumonia, tuberculosis, inflammation of the middle ear, ulceration of the cornea, inflammation of the eye, gastro-intestinal catarrh.

Treatment.— This disease is self-limiting, and can not be cut short, hence the treatment is purely symptomatic. Place patient in a well-ventilated room, isolated, temperature at 65° to 70°. The room should be light, but the eyes must be carefully shaded with smoked glasses, or by screens, otherwise they may be seriously affected. Unless the eyes can be thoroughly protected in this way, keep the room dark — an objectionable procedure. There must be absolute rest in bed, and a fruit or liquid diet. Do not give cold treatment at first; if the eruption is slow in appearing, give a hot pack or hot sponging. (See Nos. 173, 175, 179.) If the eruption prematurely disappears, or "strikes in," give hot treatment; keep the skin well oiled with cocoa-butter or vaselin. The cough, as a rule, needs no special treatment. If it does, put on a chest pack at night, and use a nebulizer containing sixty grains each of camphor and menthol in four ounces of albolene. If the cough at any time becomes severe, apply fomentations for fifteen minutes, and follow with the chest pack, which should be worn at night. The treatment may be repeated several times a day. (See Nos. 170, 178.)

Until the eruption appears, the fever should be controlled by warm baths or hot or tepid sponging. Keep the eye cleansed with a solution of boric acid, ten grains to an ounce of water, and smear the edge of the lids with vaselin. For earache, give the same as in scarlet fever; for gastric irritation, or vomiting, cracked ice, hot water, lime-water; for headache, cold compress. (See No. 186.) Keep the bowels open with enemas, at 90°, for constipation is the rule. (See No. 195.) After the eruption appears, if the temperature remains high, give an enema at 80° three times a day, and sponge with cool water.

In very many cases, measles runs such a mild course that, aside from rest and care in diet, but little else need be done. In all cases exposure during convalescence must be avoided.

GERMAN MEASLES

Synonyms.— Rubella, rötheln, epidemic roseola.

This is an acute infectious disease of short duration, characterized by an eruption that resembles measles, by catarrhal symptoms, and enlargement of the glands of the neck. It is less contagious than measles, shorter in duration, more mild in form. It is often mistaken for measles, and most of the so-called repeated attacks of measles are only rubella.

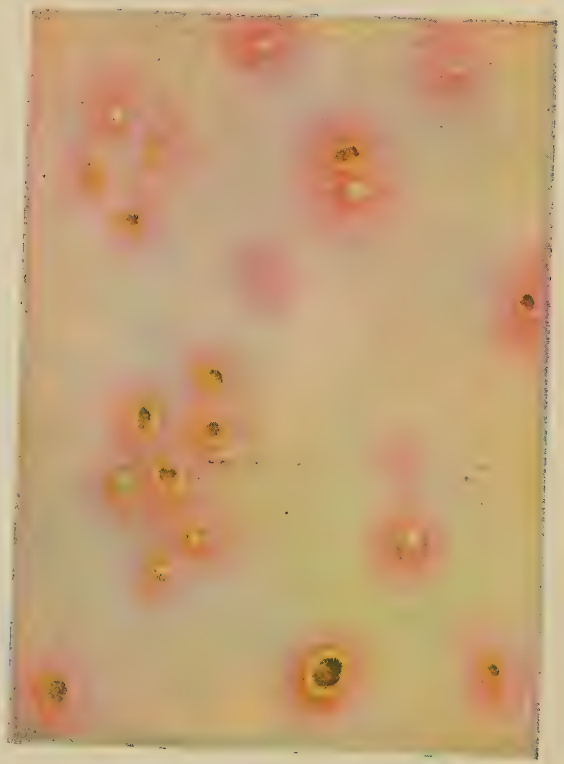
Causes.— The exciting cause is unknown; the predisposing causes are the same as in measles. The incubation period is about two weeks.

Symptoms.— Drowsiness; pain in the head, back, or joints; loss of appetite; enlargement of glands behind the ears, under the jaw, in the axilla and groin, which may become swollen and tender; watering of the eyes, congestion of the conjunctiva, and sensitiveness to light; dryness and irritation of the nose, with sneezing; sore throat; temperature, 100° or 101°. Sometimes nearly all symptoms are absent.

The Eruption.— This appears on the first or second day, and is irregular in character. It may be a very red, scarlet



Smallpox
Drawn from life



Chicken-Pox

PLATE X

color, like scarlet fever, or it may be scattered. The most common form is a small elevation, reddish in color, beginning on the face and spreading in a few hours all over the body, and disappearing in from twenty-four to thirty-six hours. There is little if any desquamation.

Treatment.— Rest, fruit diet, gruels, cold drinks, and sponging with hot water. Treat the same as for measles.

SMALLPOX

Synonym.— Variola.

This disease has existed from the remotest antiquity. Smallpox was brought into Mexico in 1520 by the Spanish soldiers, and it carried off three and one-half million people. In 1649 the Indians of North America were decimated by its ravages.

Since the general introduction of vaccination, smallpox has lost the terror that was attached to it a hundred years ago.

Causes.— Smallpox is one of the most malignant of the contagious diseases. The history of the disease shows that nearly all exposed to it, unless vaccinated, contract it. Smallpox is common to all ages, but is particularly fatal to the young. As a rule one attack confers immunity from future attacks. All the secretions and excretions are infectious.

Symptoms.— The period of incubation is from ten to fourteen days. The disease is usually ushered in with a chill, rapid rise of temperature to 103° or 104° F., marked prostration, loss of appetite, vomiting, insomnia, great restlessness, severe headache, and intense pain in the lower part of the back, rapid pulse, increased respiration; the fever remains high until the third or fourth day, when it falls several degrees, lasting until the eighth day; the second rise of temperature is in proportion to the eruption. Constipation is present. At the beginning, the disease may be mistaken for the grip.

In recent years the disease runs a mild course in the

majority of cases, and the patient does not feel sick enough to go to bed. These mild forms are often mistaken for chicken-pox.

The Eruption.— This usually appears on the third or fourth day, and runs through several stages. It is first noticed on the forehead, scalp, face, wrists, and then spreads all over the body. At first it feels like shot under the skin. About the sixth day, fluid is noticed in these little elevations, each one having a small depression in the center; on the seventh or eighth day, pus appears, and this depression may disappear; the skin is swollen, the pustules may run together; the pus may now escape, causing an offensive odor, or in a mild case may dry up. Crusts form about the eleventh day, and begin to fall off on the fifteenth day. The face may bloat, and be distorted beyond recognition. Pain is very severe. At times the sores on the skin may run together, and form the confluent type of smallpox, with aggravated symptoms. The disfigurement is always greatest in this form. No scars are left if the deep or true skin is not involved. At times the air-passages and the esophagus are attacked.

Complications.— Bronchitis, pneumonia, inflammation of the eye and of the middle ear, boils, bed-sores, and paralysis.

Treatment.— Careful isolation of patient, and vaccination of other members of the family. Rest in bed, in thoroughly ventilated room, with temperature of 65° F.; cold drinks, lemonade, carbonated waters; diet of fruits, gruels, koumiss, buttermilk, or sweet milk; reduce the fever with cold packs, cold sponging, cold enemas (see Nos. 185, 179, 195); keep the eyes clean with a saturated solution of boric acid; treat the throat by using the atomizer containing a solution made of thirty drops of carbolic acid, one ounce of glycerin, and three ounces of water (the same may be gargled); or use a solution of albolene containing thirty grains each of menthol and camphor to the ounce of albolene.

To Prevent Pitting.— At times this is impossible. A dark room is said to diminish pitting. One of the most efficient remedies is half an ounce of ichthyol to one ounce of glycerin; paint this on the pustules; or use equal parts of carbolic acid and glycerin. Avoid friction. Do not pick at the sores. Place heavy red cloth over the windows, and protect the patient with red screens.

When the face and other parts are very painful, hot boric acid compresses, followed with cold compresses, changing as soon as warm, give marked relief. Towels wrung out of cold water and applied to the body and limbs will reduce the fever and make the patient more comfortable. (See No. 186.)

All such cases are, as a general rule, under the direct personal supervision of the health officers.

Vaccination.— In the absence of a physician any intelligent person can perform vaccination. Vaccine-points are now put up by reliable firms, all ready for use, and usually definite directions are given with them. For vaccination select a place on the left arm just below the shoulder muscle. Scrub thoroughly with soap and water, then rub with alcohol. With the steel needle accompanying the vaccine-points, scrape a space on the skin about a quarter of an inch square. Do not raise blood, but scrape enough to produce a raw surface. Thoroughly rub the vaccine on this surface, and allow to dry. Then cover the arm at the point of vaccination with antiseptic gauze, and keep covered. Avoid touching the raw area or the vaccine-points with the fingers. If the vaccination "takes," a small pimple will appear about the third day, and will pass through all the stages of an active sore.

CHICKEN-POX

Synonym.—Varicella.

This is an acute contagious disease, characterized by a long period of incubation, slight fever, an eruption of short duration, and no complications.

Causes.— A disease of childhood; sustains no relation to smallpox; usually only one attack.

Symptoms.— Mild fever, and an eruption appearing the first or second day, characterized by red spots on the forehead, face, and body, widely scattered, and in the course of a few hours filling with fluid. Disease lasts about a week.

Treatment.— Rest in bed; light diet. Many cases require no treatment. If the eruption is severe, the treatment should be the same as that given under Smallpox.

MUMPS

Synonym.— Epidemic parotitis.

An infectious disease of short duration, mild symptoms, and characterized by painful inflammation of the parotid gland.

Causes.— It occurs in isolated form or in epidemics. The disease is contagious. Occurs in the colder seasons, and is most common in childhood, though adults are not free from it.

Symptoms.— The disease sets in with chilly sensations, fever 102° to 105° F., headache, a feeling of discomfort, loss of appetite, neuralgic pains, and pain just below the ear, often of a shooting or a stabbing nature; the swelling is in front of the ear, and has a doughy feeling. The glands under the jaw are swollen. All movements of the jaw are exceedingly painful; the ingestion of acid food, as lemon, increases the pain. The throat is red, and the hearing may be impaired. The swelling is greatest about the eighth day. A peculiar feature of this disease is its tendency, in the male, to invade the testicle, especially so if the patient is on the feet and moving about.

Treatment.— Mumps requires little treatment. Rest in bed is essential. Hot applications, fomentations, followed by cold compresses, hot bag, gargles every half-hour of hot water containing salt, hot enemas, light diet, avoiding acids.

Paint the swelling with one part ichthyol in two parts of glycerin. (See Nos. 170, 186, 195.)

WHOOPING-COUGH

Synonym.— Pertussis.

The disease is so named because the cough is distinguished by a prolonged, forcible, and audible inspiration, accompanied by a spasmodic closure of the glottis.

Causes.— This disease occurs in epidemics, and also in single cases. It is most contagious during the first stage. It is now supposed to be due to a definite organism. It is most frequently met with in children of from six months to six years of age. One attack protects from future attacks.

Symptoms.— This disease has three stages: (1) The catarrhal stage, lasting about ten days; (2) the paroxysmal stage, lasting from three to six weeks; (3) the stage of decline, when the symptoms gradually subside.

The disease begins as an ordinary cold, with sneezing, slight fever, running from the nose, watering of the eyes, cough, which gradually increases in violence and becomes paroxysmal and convulsive in character. The cough is a series of expiratory coughs, during which the breath is lost, the face becomes flushed and blue, the look is wild, the veins are engorged; the cough is followed by a long-drawn, whooping inspiration. At times during a paroxysm the child may vomit, or there may be nosebleed, or hemorrhage into the eyelids. The number of coughing spells in twenty-four hours varies from two or three to fifty. If the disease is prolonged, the lungs may be permanently distended, and the child may become an easy victim to tuberculosis. The disease may last from three to six weeks. Whooping-cough should not be considered a trivial malady.

Treatment.— In speaking of the treatment, Dr. William Pepper says: "The truth is, the treatment of whooping-cough remains still in the stage of empiricism, and as nearly

every remedy in the materia medica has been tried to relieve the cough, so appeal is made to every new remedy." Dr. Osler says: "The medicinal treatment is most unsatisfactory."

Fresh air night and day is one of the most essential elements. In the first stage, the child should be put to bed, and isolated from other children. The sputum should be destroyed. The child should be clothed in flannel, and protected from sudden changes of temperature. The diet should be light and nutritive. Fomentations to the chest and spine, cool sponge baths in the morning (see Nos. 170, 179), inhalation of steam, or a spray of menthol twenty grains to the ounce of albolene, or a spray of a two-per-cent solution of resorcin. Eggs, meat, tea, and coffee, with all condiments, should be avoided. The mucus in a very young child's throat may be removed quickly with the finger covered with a thin cotton cloth.

When the cough is very severe, see that the child drinks water freely; and, in addition to fomentations to the chest every three or four hours, put on the chest pack during the interval. At bedtime a warm pack continued for an hour will quiet the child and induce sleep. (See Nos. 170, 178, 175.)

During convalescence, build the child up with abundance of good, wholesome foods, plenty of milk and especially cream, a salt rub once a day, and rides in the sunshine and open air.

DIPHTHERIA

Synonyms.— Diphtheritis, malignant sore throat.

This is a contagious disease, affecting the throat and upper air-passages, with a tendency to spread.

Causes.— Diphtheria is a germ disease, and the exciting cause is the Klebs-Löffler bacillus, which is found only in the exudate of the membranes. It is a highly contagious disease, and is rapidly communicated from person to person.



PLATE XI. Diphtheria

Note the extension of the false membrane to the soft palate

This disease is steadily on the increase in the large cities. According to Dr. W. G. Thompson, diphtheria is common among certain animals, such as fowls, pigeons, calves, pigs, dogs, and cats. The infection may be carried in the clothes, hair, handkerchiefs, toys, rugs, books, or by coughing into the face of another. The spread of diphtheria is favored by bad hygiene, damp, dark houses, poorly ventilated cellars, poor plumbing, sewer-gas, and a general lowering of the vitality. It is most common during the winter and spring. Children under six are the most susceptible, though it may occur at any age. Many cases of acute sore throat and acute tonsillitis are mistaken for diphtheria, and *vice versa*. Many cases are unsuspected and infect whole neighborhoods. No child with an acute cold, acute sore throat, or fever should be allowed to remain at school.

Symptoms.—The onset is slow. There is a feeling of restlessness, with loss of appetite; there may be nausea and vomiting; dryness and soreness of the throat on swallowing; some pain in the throat; moderate fever, as a rule not rising above 103° F., and irregular; the pulse is rapid and weak; the bowels are constipated; the urine is scanty and dark; the glands of the neck are swollen and tender; the muscles are stiff; movement of the jaw is painful.

Local Examination.— About the third day a false membrane forms on the tonsil, and on the soft palate, and it may spread to the throat. This membrane is at first of a grayish-white color, and finally becomes a dirty gray or a dirty yellow color. If the membrane is pulled off, it leaves a raw, bleeding surface.

If the false membrane extends into the larynx or into the back nasal passage, the symptoms are more grave; in the former condition the mortality is about seventy-five per cent.

In malignant diphtheria the symptoms are very severe; the prostration is marked, and there may be extensive

sloughing of the tissues affected. Diphtheria usually lasts from ten days to two weeks.

Complications.— Pneumonia, bronchitis, disease of the heart, inflammation of the kidney, and paralysis of the muscles of the throat or the muscles of the eyes. Paralysis occurs in over ten per cent of cases, coming on during the second or third week of convalescence.

In diphtheria there is extreme depression, because of the large amount of poison formed by the germs. This is one reason why the fever is not very high. The body is unable to react against the toxic substances with which it is flooded.

Treatment.— A physician should be called at once, and antitoxin given in large doses. Isolation is of the utmost importance in this disease. If possible, there should be no communication between the sick child and other members of the family. The nurse and physician are the only ones that should come in contact with the patient. The room should be cool, not above 68° F., well ventilated, and void of all needless furniture and fixtures. Sheets soaked in a five-per-cent solution of carbolic acid, or in bichlorid of mercury, $\frac{1}{1000}$, should be hung up at the doors communicating with other rooms. One sanitarian suggests that the dishes used by the patient be let down from the window, or that they be kept in the room, disinfected, and used only for the patient.

The diet should be light and nutritious,— fruits, iced fruit juices, gruels, rice, koumiss, buttermilk, and milk. The child should be fed at regular intervals of three or four hours. Cold acid drinks, such as lemonade or pineapple juice, are often serviceable. If the patient can not take food by mouth, nutritive enemas become necessary. (See No. 196.) Move the bowels daily with enema at 90°.

If diphtheria is suspected, because of other cases in the neighborhood, put the child on a fruit diet for one or two days, give an enema at 106° at the very first, followed with a

hot pack for at least thirty minutes, ending with a brisk cold application. Repeat next day. (See Nos. 195, 175, 179.)

Give fomentations to the spine six to ten minutes three times a day, followed by cold friction, 80°, if the child is more than two years old. This will maintain the heart and circulation. In an older child apply cold compresses, 70°, over the heart fifteen minutes three or four times a day. Alcohol is not required in this disease. It is positively harmful. (See Nos. 170, 186.)

Local Treatment.— Ice taken frequently in the mouth tends to relieve thirst and reduce congestion. The early continued application of cold to the throat is of the greatest service. Apply a rubber bag half filled with cracked ice to the throat, or cracked ice in a folded towel will do. (See No. 199.) To be effective this must be continuous. Alternate every hour with hot applications for ten minutes. After the false membrane has thoroughly formed, ice is of no more service, and hot applications should be substituted, combined with cold compresses, changed every twenty to thirty minutes. If a child will not tolerate the cold treatment, apply heat, as hot as can be borne. (See Nos. 186, 170.)

Local applications may be made by an atomizer or spray, a nasal douche, gargle, inhalations, or the use of the swab. The simplest form of inhalation is steam impregnated with lime-water, or the atmosphere of the room may be made moist by slacking lime. The throat may be sprayed or mopped with saturated solution of boric acid in cinnamon water, or a solution containing peroxid of hydrogen, one ounce; glycerin, two teaspoonfuls; boiled water, half an ounce. Or the throat may be swabbed with the following solution: Menthol, ten grams; toluol, thirty-six grams; tincture of chlorid of iron, four grams; absolute alcohol, sixty grams. If the disease extends into the nose, use a nasal douche of diluted listerine, one part to four parts of water; or one part peroxid of hydrogen to six of water may be used.

In case of heart failure, indicated by blue lips, fingernails, and skin, give a hot pack for three minutes, and follow quickly with cold friction. (See Nos. 175, 184.) Be sure the feet are warm. Repeat once an hour if necessary.

Watch the kidneys carefully, for serious complications may arise when the patient seems to have made a good recovery. Sudden heart failure is common as a sequence of diphtheria, and for this reason one convalescing from the disease must be kept quiet.

If the glands of the neck become painful, they may be painted over with ichthyol, or with tincture of iodin.

After recovery the head of the child should be thoroughly shampooed, and the room disinfected in the same manner as described under Scarlet Fever. A child should be kept out of school at least a month after all symptoms have disappeared.

PNEUMONIA

Synonyms.— Lung fever, lobar pneumonia, croupous pneumonia, pneumonitis.

Causes.— Pneumonia prevails in nearly all countries, and at all ages. In the United States, it is said to be more common in the South than in the North. It is most common from February to May, decreases in frequency during the hot months, and begins to increase in October and November. Pneumonia is a common complication of *la grippe*, measles, scarlet fever, typhoid fever, and cerebrospinal meningitis. Its development is favored by any condition lowering the vitality, such as becoming chilled when warm and sweating, poor ventilation, poor food. Alcoholism especially predisposes to pneumonia. It is now generally accepted that pneumonia is an infectious disease, and is due to a special germ.

In this disease there is a marked congestion of the lung, the lower right lung being the one most often affected. The entire lung may be diseased, or even both lungs. The dis-

eased condition of the lung is divided into three stages. The first stage is one of congestion. This usually lasts only a few hours. In the second stage the lung becomes so engorged with blood, fluids, blood-cells, germs, and waste tissues that it becomes solid, and would sink if put in water. This is the stage of "red hepatization," during which the lung may look somewhat like the liver. The next stage is one of "gray hepatization." In this stage it looks gray and mottled, because the pigment from the blood has been absorbed, and blood can not circulate through it. This stage may last from four to eighteen days. Following this the inflammatory exudate is absorbed, and the lung may return to its normal functions, either partially or completely.

Symptoms.— The onset is usually sudden, with a severe chill, followed quickly by a high fever. At times the patient may feel ill for several days, have chilly sensations, a little fever, headache, and a feeling of oppression in the chest. The following symptoms appear in pneumonia: high fever, 104° or 105°, continuing until about the seventh or ninth day, when the crisis comes, and the temperature falls quickly, and may then become subnormal; breathing is labored, rapid, superficial, and painful; the pain at first is very sharp; cough, at times very distressing; expectoration, scant at first, may become quite profuse the second week; the sputum at first is thick, glary, tenacious, rusty, or bloody colored; the face is flushed; cold-sores form on the lips or nose; there is loss of appetite, with constipation; the pulse is about one hundred, full and strong at first (a pulse over one hundred twenty in the adult is a cause for anxiety); the skin is very dry and hot, or bathed in perspiration, during the disease.

Complications.—Pleurisy, organic heart-disease, cerebro-spinal meningitis, and tuberculosis often follow pneumonia. Pneumonia is considered by all the best authorities to be on the increase.

The mortality in pneumonia is from twenty to forty per

cent, and death occurs most frequently between the fifth and ninth days. It is one of the most fatal of acute diseases.

Treatment.—Pneumonia, like measles, scarlet fever, and typhoid fever, is a self-limiting disease, and pursues a definite course, however efficient the treatment may be. Dr. Osler says: "It can neither be aborted nor cut short by any known means at our command. Even under the most favorable circumstances it will terminate abruptly and naturally, without a dose of medicine having been administered."

Absolute rest is of the utmost importance. The diet should be largely liquid; it should consist of such foods as fruits, fruit juices, gruels, buttermilk, zwieback, milk toast, egg-nog, and broth. Patients are more likely to be overfed than underfed, and many lives have been sacrificed because of failure to restrict the appetite during a consuming fever.

At the beginning of the disease the patient should be given a thorough, hot enema, 110°. Apply cold compresses, 50° to 60°, changing every ten minutes, or cracked ice in a rubber bag or between towels or in a sack, to the affected side continuously, alternating every two hours with fomentations for twenty minutes. (See Nos. 186, 170.) This treatment should be kept up for twenty-four hours. After this the hot treatment is more effectual, and should be repeated several times a day, alternating with cold compresses. (No. 186.) Some patients can not stand cold treatments to the chest. In such cases apply large fomentations to the affected side, front, and back, from ten to twenty minutes, according to the relief afforded, every two to three hours, and during the intervals apply a compress at 60°, changing as soon as warm, or in fifteen to thirty minutes. This should not be kept up so constantly as to tire the patient. At night the patient should be allowed to sleep as much as possible, without treatment. If the pain in the side is very severe, place a wide, tight bandage of cheese-cloth around the chest, and apply the treatment outside of this. Keep the bed dry, by all means.

The cotton jacket or the mud jacket is of little service in pneumonia.

The fever may be controlled by the wet sheet pack and by cold sponging, or by applying cold wet towels to the trunk, changing as soon as they become warm. Continue the treatment for half an hour. (See Nos. 185, 179.) If the feet are cold, give a hot foot bath, or keep hot cans, hot irons, or a hot bag to the extremities. Attention should be given to the bowels daily. For the high fever in pneumonia, the cold enema, at 60° to 70° (if an adult under sixty years), every four hours is an excellent means to reduce the temperature. It should be retained ten or fifteen minutes. Headache will be relieved by ice-cold compresses to the head, and a hot foot bath. If the inflammation is on the left side, an ice-bag (see No. 199) or cold compresses over the heart fifteen minutes every three hours, will prevent the exhausting influence of the surrounding heat and of the poisons circulating in the blood. The hot leg pack, with cold to the chest, will help in reducing the congestion of the lungs. (See Nos. 176, 186.) Alcohol is unnecessary in pneumonia, and lessens the patient's chance of recovery. Care must be exercised to see that the patient does not become chilled. The ventilation should be thorough, and the temperature of the room should not be over 60° to 65° F.

The crisis is a critical time in pneumonia, and the outcome depends largely upon the care given the patient at that time. Symptoms of collapse are often marked with a temperature at 97° or 96°. Under such circumstances it is necessary to sustain the patient with hot treatment, hot enemas, hot dry pack, hot bath, or fomentations to the spine, and hot drinks. (See Nos. 195, 175, 170.) One should avoid a solid diet too soon after the crisis, also a diet of meat, or other stimulating food.

When the crisis is past, the patient should have hot and cold applications to the diseased lung fifteen minutes three

times a day, followed by cold friction. This will greatly shorten the period of convalescence. (See Nos. 189, 184.)

ACUTE INFLAMMATORY RHEUMATISM

Synonyms.— Rheumatic fever, acute articular rheumatism.

Causes.— Exposure to cold and wet, sudden chilling of the body when the skin is hot and relaxed, exhaustion, cool climate, defects in tissue changes, nervous influences, excessive use of meat, alcohol, and other stimulants. The exciting cause is now considered by leading physicians to be a specific germ.

Symptoms.— The onset is often sudden, with chilliness, fever, 104° or 105° or higher, headache, coated tongue, sore throat, tonsillitis at times, loss of appetite, constipation, scanty and highly colored urine, pain in the joints, increased by any movement; several joints are involved at a time, in which there is marked swelling and inflammation; or the disease may attack the different joints progressively, or suddenly shift from one to another. The knees, ankles, and elbows are the joints most frequently affected. The skin is hot, and usually covered with a sour, acid sweat. The disease may last from a few days to several weeks.

In a large percentage of cases the heart is overcome by the fever and poison, and organic heart-disease results.

Treatment.— Rest in bed. The room should be cool and well ventilated. The diet is a very important factor in rheumatism. Fruit, fresh or stewed, fruit juices, lemonade, and well-made gruels and cereals furnish by far the best diet. The bowels should be moved daily with the cool enema. At the beginning of the disease the patient should be given a hot enema, 110°, a hot leg bath, followed by a dry blanket pack, until he perspires freely; allow this to continue for one or two hours. (See Nos. 195, 171, 175.) While giving this treatment apply cold compresses to the neck and head. (See

No. 186.) The sweating pack may be given for the first two or three days. Follow with cold friction, but avoid unnecessary exposure of the patient. (See No. 184.) During the fever, when the patient sweats, avoid all cold treatment, but rub frequently with a dry towel. Otherwise, when the temperature is above 104°, the patient should have cold friction or large compresses every three hours, and the cold enema, 80°, four times a day. Every four hours cold compresses or the ice-bag should be applied for fifteen minutes over the heart. (See Nos. 186, 199.) For the night, wrap the inflamed parts in a well-wrung cold compress, cover with oiled silk or rubber sheeting or oiled paper, and outside of this wrap one or two thicknesses of flannel. If there is pain in the back, apply fomentations for a few minutes. (See No. 170.) Locally the joints should be put in hot packs, surrounded with hot bags, for twenty to thirty minutes, followed by cold compresses wrung out of ice-water and renewed frequently. This gives great relief, and stays the progress of the disease. The compresses should be covered with two thicknesses of flannel. (See No. 186.)

Ichthyol spread over the joints, or spread on cheese-cloth and bandaged over the joints, affords relief. Compresses wrung out of a strong hot salt solution, in many cases affords great relief. Oil of wintergreen applied to the joints and covered freely with cotton, and this in turn with a flannel bandage, makes a good dressing for the night.

At times the pain in acute articular rheumatism is so intense that the least motion of a finger or limb causes the most agonizing suffering. For this reason the utmost gentleness should be exercised in treating the patient. In the use of the bed-pan, let two persons assist the patient. Encourage free water drinking at all times.

During convalescence from acute rheumatism the patient should be exceedingly cautious about getting up, sitting up, or walking, too soon. The heart is very weak following this

disease; and exertion, even so much as sitting up too soon, may cause serious and even permanent heart weakness. Care must be exercised in this matter for several months.

An attack of acute rheumatism predisposes a person to chronic rheumatism; hence meat, tea, coffee, and a highly nitrogenous diet should be avoided.

The same principles of treatment as given above, apply to dengue fever, which is more common in tropical climates.

ERYSIPELAS

Synonym.— St. Anthony's fire.

Causes.— This is an acute contagious disease, and is due to pus germs, or the *Streptococcus erysipelatis*. It may follow childbirth, or any disease that lowers the vitality. The germs of erysipelas are wide-spread, and those persons having any abrasion of the skin are especially susceptible to the poison by inoculation. The disease is often epidemic.

Symptoms.— In most cases the disease appears on the face, near the nose or ear. The skin becomes bright red, is very much swollen, is quite firm to the touch, and has a distinct border.

The disease begins with symptoms of fever, headache, chilliness, loss of appetite, constipation, some fever, and a tingling in the part affected. The fever is about 102° or 103°; at times the swelling is so marked that the eyes are completely closed. The glands in the neck are enlarged and inflamed, and may even break down. The fever usually lasts four or six days, and then falls suddenly; the redness fades, and the swelling disappears. At times the inflammation may extend into the brain, or into the mouth, both being serious conditions. In the old and feeble, erysipelas may prove fatal. It is especially severe in alcoholics.

Treatment.— Care should be exercised to prevent a spread of the disease. Absolute rest is necessary. The disease is self-limiting. Cases often recover, even without



PLATE XII. Erysipelas

treatment, but neglect is dangerous. The diet should consist principally of fruits and gruels. A thorough enema should be given each day. Reduce the fever with cold or hot sponging. Locally, ice-cold compresses may be applied for the first day, or the parts may be painted over with fifty per cent of ichthyol in vaselin and covered with a cloth. The parts may also be bathed with a saturated boric-acid solution, or compresses of corrosive sublimate, $\frac{1}{5000}$, may be applied. It is said that collodion painted on the border of erysipelas will prevent the extension of the disease.

Cold compresses at 60° may be applied directly over the ichthyol compress. Or the face may be painted over with the following, using a camel's-hair brush: Ichthyol, two drams; ether, one dram; collodion, five drams. Wash off daily, and renew. A nurse attending an erysipelas patient should not go to a woman in confinement.

ASIATIC CHOLERA

This is an acute infectious disease, severe in all its manifestations, and attended by a high mortality.

Causes.—The exciting cause is the Koch comma-bacillus, or the germ of Koch. The predisposing causes are unsanitary surroundings. The disease is communicated principally by drinking water. It is common in China and India, and has appeared in epidemic form in nearly all parts of the world. Cholera originated in India, in which country it is epidemic. From that country it is communicated along lines of travel and commerce. Other predisposing factors of the disease are privation, famine, debauchery, fatigue, alcoholism, eating decomposing meat or spoiled fruit, and exhausting diseases. Cholera is strictly a filth disease, and is, therefore, more common among the lower classes of society. Its chief victims are found in the slums and dirty quarters of large cities.

Physicians and nurses are not likely to contract the dis-

ease if proper precautions are taken to boil the water used, to eat well-cooked food, and to avoid overwork.

Symptoms.— The disease is divided into several stages, according to the symptoms: —

First Stage.— The stage of invasion. It usually commences with diarrhea. The stools are watery, yellowish, very profuse and violent, and there may be fifteen to twenty within twenty-four hours. There is intense colic, headache, nausea, vomiting, mental depression, and excessive thirst; the voice is faint.

Second Stage.— Cold stage. The temperature in the mouth or axilla is low, while in the rectum it may be 103° or 104°; the respiration is rapid, the pulse weak and thready, the skin cold and shriveled. Pain in the bowels continues, and cramps in the legs are frequent; the eyes are sunken, the cheeks hollow, the nose pointed, the features pinched and blue. The stools are more frequent, less copious, alkaline, watery, with a meaty odor, frothy, almost transparent; they are called rice-water stools. Collapse is marked, and the blood is so depleted of its watery constituents that the patient may die from exhaustion. If death occurs, it is usually in the second stage. Fatal cases usually end in two or three days. The mind is clear to the last.

Third Stage.— Stage of reaction. The patient becomes warm, the heart more regular, vomiting ceases, and diarrhea stops.

Treatment.—The first treatment must be preventive, and consists of a rigid enforcement of sanitary rules and personal hygiene: carefulness in diet, boiling all drinking water, avoiding great fatigue and all excesses, and a faithful disinfection of all the discharges. (See under Typhoid Fever.)

Drugs are of little avail in cholera. At the first appearance of diarrhea, the patient must go to bed, be quiet, and be well covered. Very hot fomentations should be applied to the abdomen for fifteen minutes, followed by compresses

wrung out of water at 60°, and changed every fifteen minutes for two hours. (See Nos. 170, 186.) All food should be withheld at least twenty-four hours. When the colic pains and the muscular cramps are severe, the patient should be given a hot bath at 108° for twenty minutes, or a hot blanket pack for thirty minutes, followed by cold friction. (See Nos. 173, 175, 184.) The patient should drink lemonade and other acid drinks; ice may be held in the mouth. The cholera germ can not grow in an acid medium.

During the second stage the patient should be kept as quiet as possible, and surrounded with hot bottles or hot-water bags. Give brisk, short cold applications three or four times a day. He should be lifted in and out of the hot bath; this may be repeated every three or four hours. Hot enemas may be given during each stage; a hot rectal injection, containing ten grains of tannin to four ounces of water, or the starch enema (four ounces of thin starch water), gives much relief. It is necessary to restore the depleted blood as much as possible, and this may best be done by giving a high rectal injection of the following: Boiled water, two quarts; tannin, ten grains; common salt, three teaspoonfuls; powdered gum arabic, fifty grains. Elevate the hips, and give very slowly. This can be made a continuous enema by tying the rubber tubing in such a way that its contents will flow at about the rate of one drop each second.

The stools and vomited matter should be disinfected with bichlorid of mercury, $\frac{1}{1000}$, or a five-per-cent solution of carbolic acid.

During convalescence the diet should be light and fluid.

Treatment during convalescence same as in any fever.

DYSENTERY

Synonym.— Bloody flux.

Dysentery is an inflammatory disease of the large intestine, often of an infectious nature, characterized by extensive

catarrhal conditions of the mucous membrane, ulceration, discharges of blood, mucus, and pus, with intense straining and severe colicky pains.

Dysentery is considered one of the great epidemic diseases of the world. In the tropics it is said to be more fatal than cholera; and during the Civil War it caused more deaths than bullets and shells.

Causes.— The disease occurs most frequently during the summer and autumn. Sudden changes in temperature are predisposing causes. It occurs at all ages. Dyspeptics are especially subject to the disease. It is caused by poor and insufficient food, irritating foods, unripe or decaying fruit, drinking stagnant water, filth, poor ventilation, mental depression, and habitual constipation; one form of dysentery is caused by an animal parasite called the *Ameba coli.*

Symptoms.— There are several varieties of dysentery, but for brevity's sake the symptoms will all be given together. Diarrhea is the most constant symptom. The onset may be very sudden, or come on gradually, with increasing severity. The stools may vary from fifteen to one hundred in twenty-four hours. At first they consist mostly of mucus and blood mixed with fecal matter. Later they become a jelly-like mass and more bloody. There is a constant disposition to strain in the ineffectual effort to empty the bowel. This is a most distressing feature of the disease. There is fever of a moderate degree and headache. The tongue is coated and moist; later, it becomes red and glazed. The appetite is lost, and thirst is intense. At times the prostration is marked. The abdomen is tender to pressure, and the patient suffers from colicky pains. As the disease advances, emaciation and loss of strength are very great.

Complications.— Peritonitis, due to perforation of the intestine by ulceration. Abscess of the liver is common in tropical climates, but rare in temperate climates. Paralysis from inflammation of the nerves.

Prognosis.— In the simple catarrhal dysentery, the prognosis is good, recovery taking place within a week. In the severe form, the mortality is very high. Children, the aged, and the debilitated quickly succumb to the disease. Relapses are common.

Chronic Dysentery.— This usually follows an acute attack. The principal symptom is diarrhea, which if constant is attended with loss of strength and emaciation.

Treatment.— The patient should have absolute rest in bed, and should use a bedpan instead of getting up to stool. At the onset, the entire bowel should be emptied by taking a large dose of castor-oil, one or two tablespoonfuls, or a tablespoonful of epsom salts; this should be followed by a large cleansing enema, given slowly, with the patient's hips elevated.

Give no food for one or two days. If the disease is of several days' standing, purgatives must be avoided. The colicky and abdominal pain is best treated by large fomentations for fifteen minutes, followed by cold compresses of several layers of cheese-cloth wrung out of water at 60°, and changed every twenty minutes for two hours, followed by a repetition of the fomentations. (See Nos. 170, 186.) This treatment may be kept up almost constantly. At night put on a moist abdominal girdle. (See No. 188.) The fever is best reduced by cool sponging and by the application of cold water, accompanied by rapid but superficial friction of the skin. (See Nos. 179, 184.)

The bowels should be irrigated frequently with large enemas at 100°, or the cold enema at 60° may be more agreeable. If the rectum is so irritable that a tube can not be inserted, place a small piece of ice in the rectum first. At times even small injections of ice-water give immediate relief. Let the patient drink freely, but not of very cold water, for this stimulates intestinal movements. No food should be taken for the first twenty-four to thirty-six hours. The diet should

consist of barley-water,[1] strained rice-water, gluten gruel, and fresh fruit juices without sugar. Use no fruit with seeds or skins. Blackberry juice and huckleberry juice are best. Give several glasses a day. During convalescence care must be exercised not to adopt a nitrogenous diet too soon. Food should be very thoroughly masticated, and eaten slowly.

The oft-repeated statement that patients having a diarrhea should avoid fruits is without scientific foundation. The pulp of fruit should be avoided, and likewise sweetened fruit juices, but the fruit juices mentioned above, as a rule are well borne. They should not be given, however, with a milk diet, or with eggs. No fats should be taken during the acute stage. Fats or oils, such as pure olive-oil, are well borne in the chronic stages of the disease. In all forms of diarrhea, acute or chronic, very cold water drinking should be avoided, for the reason given above. Hot water drinking is indicated.

MALARIAL FEVER

Synonyms.— Chills and fever, ague, swamp fever, miasmatic fever.

Varieties.— (*a*) Intermittent fever, in which there is a cold, hot, and sweating stage. The paroxysm may come on at a certain time every day, every other day, or every fourth day; (*b*) remittent fever, sometimes called bilious fever or jungle fever, a form of malaria in which the fever is present every day; (*c*) pernicious malarial fever, or congestive chills.

Causes.— This disease is due to a parasite, called the plasmodium of Laveran, having been discovered by this physician in 1880. This organism gains entrance to the body through drinking water; and recent investigations show conclusively that the mosquito carries the parasite about, and inoculates man by its bite.

[1] To make, add one ounce of pearl barley to a quart of water; boil down to a pint, strain, and add a very little salt. Keep cool.

Malaria is most common in the summer and early fall. The predisposing causes are moist and rainy seasons, in the tropics especially, cool nights and hot days, low, badly drained soil, swampy lands, luxuriant vegetation, with decaying vegetable matter; for these conditions all favor the development of the mosquito. Visitors to malarial regions are very likely to have the disease. The late war in Cuba and in the Philippines demonstrated that in regiments where all the drinking-water was boiled, and precautions were taken against mosquito bites, few of the soldiers had malaria.

In malaria the parasite passes into the blood streams, and attacks the red blood-corpuscles and destroys them. During a paroxysm, millions of red cells are thus destroyed. As the parasites enter the blood, they produce a poison, which contracts the capillary circulation of the skin and vital organs, and interferes with the heat-regulating centers of the body to such a degree that a chill is produced, which is nature's way of stimulating the heat-producing centers in order to burn up the poison. The only positive way of diagnosing malaria is by means of the microscope. With this instrument the parasite may be found in the blood.

Symptoms.— *a. Intermittent Fever.*— 1. *Cold Stage.*— The patient usually knows he is going to have a chill several hours before it occurs, by his peculiar feelings of languor, dulness, yawning, headache, and uneasy feelings in the stomach. The chilly feelings begin in the back and loins. Gradually the patient begins to shiver, the chill becomes more violent, the teeth chatter, the features are pinched, the skin is in that condition known as goose-flesh, and is actually cold; the ears, nose, and tips of fingers are livid. The patient calls for more covering. During the chill the fever may be 104° to 106°. The chill lasts from a few minutes to an hour or more.

2. *Hot Stage.*— The skin becomes hot, the face is flushed, the liver and spleen are congested. There is a throbbing

headache, restlessness, irritability, coated, dry tongue, foul breath; there may be vomiting, intense thirst, constipation, pain in the back and limbs. The hot stage lasts from half an hour to three or four hours.

3. *Sweating Stage.*—Profuse perspiration and disappearance of the fever. Sweating first begins on the face and forehead. Pain subsides; patient feels exhausted and passes into a quiet sleep. This stage lasts from two to four hours. The entire paroxysm occupies from six to twelve hours, according to the severity. During the intervals the patient may feel perfectly well, but there is likely to be loss of appetite, and weakness, from the destruction of the red blood-cells.

A person may not always have a severe chill. During the paroxysm, the spleen is enlarged and tender. The liver is enlarged. Fever-sores often appear on the lips. The disease may terminate after ten days or two weeks without any special treatment.

b. Remittent Malarial Fever.— Occurs in temperate and sub-tropical climates, and is common in early summer and fall. Symptoms are irregular; there may be headache, coated tongue, loss of appetite, constipation, highly colored urine, fever, with temperature ranging from 104° to 106°; the skin is hot, the face flushed, and there is pain in the head and limbs. Vomiting is frequent, and in a few days jaundice may develop, because of the destruction of red blood-cells. Examination of the blood with the microscope reveals the malarial parasite. This type of malaria is often mistaken for typhoid fever. A positive diagnosis depends upon a blood examination in either case. The average duration of the disease is from one to two weeks.

c. Congestive Chills.— All the symptoms are very severe. There is great prostration, cold skin from the first, feeble pulse, delirium, stupor, unconsciousness, and even hemorrhage from the mucous surfaces of the body.

Treatment.— Boil all water when in malarial regions. Avoid mosquito bites as much as possible. Use mosquito-netting. Increase the vital resistance by carefulness in diet and by the daily morning cold water rub.

Treatment for chills and fever should be begun several hours before the expected chill. If the chill is expected, say at noon, the temperature should be taken at seven o'clock, and every half-hour thereafter. A gradual rise of temperature indicates that a chill will follow if not prevented. At the first rise of temperature begin treatment. Give an enema at 110°. Have the patient drink hot water freely. If the circulation of the skin can be kept up thoroughly, the chill can be prevented, or at least made very light and brief.

The activity of the skin can best be maintained by cold water at 60° or lower, applied vigorously to the skin with a coarse cloth or mitten. (See No. 184.) It may be necessary to repeat this tonic treatment every hour or every half-hour. Care must be exercised not to expose the patient to cold drafts. On the day of the expected chill keep out of the sun. Malarial chills never occur at night. Keep in bed, in a dark room. Two or three hours before the expected chill, after giving the hot enema, place the patient in a dry blanket pack, surrounded with hot-water bags, or hot bottles, bricks, sand bags, or anything that will retain the heat. See that the neck and shoulders are protected from cold air. (See No. 175.)

At the first appearance of moisture on the upper lip or on the brow, gradually remove the blankets, avoiding drafts. During the interval between the paroxysms, invigorate the skin and increase the vital resistance by giving a cold friction bath three times a day. Excessive eating, drinking, mental strain, and overexertion must be avoided.

During the sweating stage, the patient's comfort is promoted by wiping the skin frequently with a dry cloth.

Quinin.—This drug is now considered by the medical profession as a specific cure for malaria. If used judiciously, it no doubt will help in many cases. Quinin interferes with the vital processes of the body. It stops the movements of the white blood-cells, preventing them from destroying the invading foe. It lessens the oxygen-carrying power of the red blood-cells, which diminishes the power of the body to resist disease. It prevents the burning up of poisons in the tissues, and so invites disease. It depresses the nerve-centers of the brain and spinal cord, lessening vital resistance. Quinin is a poison to all forms of life, and is a good germicide, but because of its price is not used for this purpose.

Quinin sulphate acts very slowly if the hydrochloric acid of the stomach is absent, which is always the case in high fever. If given in large doses, it can not be dissolved, and so passes out through the intestinal canal. Quinin is soluble only in an acid solution, hence it should be given in this manner. If the liver is very congested, quinin will not act in the body, and is of little use in a certain stage of malaria. But we find that the liver is always more or less congested in this disease.

If quinin is prescribed for malaria, it may be given in doses of from two to five grains in capsules every half-hour, beginning with the first rise of temperature. It is most effective given in a two-per-cent solution of tartaric acid.

In bilious fever the patient should have absolute rest in bed, and eat fruit and grains. Lemons are especially wholesome. The bowels should be kept open daily by means of a cool enema. Reduce the fever by sponging with cold water every two hours, or by giving a wet sheet pack every four hours, or by fomentations over the liver and spleen, followed by cold compresses changed every fifteen minutes for two hours at a time. (See Nos. 195, 179, 185, 170, 186.)

Those who have had repeated attacks of malaria, need a thorough course of treatment; while the system is full of

poison, no great degree of health can be expected. They should seek a different climate for a time at least.

TUBERCULOSIS

This is an infectious disease, caused by a germ called the *Bacillus tuberculosis.*

Tuberculosis is one of the most wide-spread of all diseases. It is common in all countries, in all climates, in all races, and occurs at all ages, and no organ nor part of the body is immune to its ravages. It is very common in cattle and sheep, and occurs in hogs, chickens, fish, dogs, cats, rats, and mice. Indians and negroes are very susceptible to tuberculosis.

One death out of every seven is due to this terrible disease. In some large cities and in crowded districts one death out of every four is the result of tuberculosis. It has properly been called the great white plague. It has become so common that we stop to think of it only when some one dear to us is stricken with this fatal malady.

Causes.— Tuberculosis is not hereditary, but a weakness tending toward this disease may be inherited. Those who choose to live above this disease may do so. If cherished, the forces of healing in our bodies are always stronger than the forces of death. As a weak spear of grass or a stalk of wheat defies the laws of gravitation and lifts its head up into the air, because of the life within it, so we, by proper relations to the laws of life and the Giver of life, may defy the law of heredity that says we must die from tuberculosis, cancer, or some other grave disease.

The tuberculosis germ is found in many cases of tuberculosis, and is generally considered to be the cause of the disease. This germ is ubiquitous. It is in the dust of carpets, on the floor, on the walls, in the air, in the streets, in the cars,— everywhere except in mid-ocean and on high mountains. The only reason we do not all die from the

malady is because the vital resistance of the body is sufficient to combat the attack of the disease. No one becomes a prey to tuberculosis until his disease-resisting powers are lowered; then the germ may begin to feed upon his tissues.

Predisposing Causes.— Dyspepsia, auto-intoxication, excesses in eating and drinking, poor food, overwork, lack of exercise, sedentary life, immoderate mental work, loss of sleep, sexual excesses, masturbation, poor ventilation, breathing of foul air and dust, milk from tubercular animals, tubercular meat, bad positions, catarrhal condition of the mucous membrane, frequent colds, which have been neglected, or passed by as insignificant, weakness produced by most of the infectious diseases, such as typhoid fever, pneumonia, measles, whooping-cough, smallpox, intimate association with one who has tuberculosis.

Symptoms.— 1. *Acute Tuberculosis.*— Chills, fever, pain in the side, cough, expectoration, marked prostration, labored breathing, blueness of the face, fingers, and skin, consolidation of the lung. The pulse is rapid and weak. The disease may prove fatal in a few weeks, or it may be protracted for months. This form usually occurs in children who have had whooping-cough or measles. In another acute type of tuberculosis the symptoms very much resemble typhoid fever. In acute meningeal tuberculosis, nervous symptoms predominate.

2. *Tuberculosis of Lymphatic Glands, or Scrofula.*— Occurs in poorly nourished children, and frequently follows measles. The glands in the neck are most often involved. The glands are at first isolated, then form knotted masses and become inflamed. Later on, pus is formed and they break down. Death rarely occurs from this form. Children get well even in aggravated cases.

3. *Acute Phthisis, or Galloping Consumption.*— The attack comes on abruptly, often with a chill, pain in the side, fever, cough, rusty-colored expectoration, which later be-

comes thick and yellowish, difficult breathing, night sweating, and rapid loss of flesh and strength. Physical examination of the lungs reveals important signs. At first this form of tuberculosis is mistaken for pneumonia. It is from three to six months in duration, and terminates fatally.

4. *Chronic Tuberculosis.*— The symptoms of this form are well known to most people, for all have abundant opportunity to observe those who are wasting from consumption. The onset is slow.

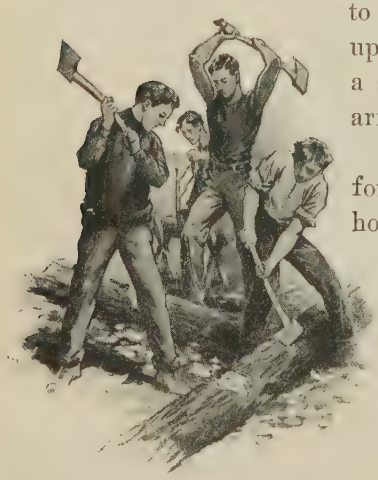
The cough, one of the earliest symptoms, is at first dry and hacking, and is most likely to occur at night or early in the morning. There is pain in the chest, often of a stabbing character. The expectoration is usually abundant. If examined with the microscope, the tubercular germ is found. There are gastric disturbances, with loss of weight and strength, emaciation, pallor of the face, hectic flush of the cheeks in the afternoon, daily rise of temperature, night sweats, rapid pulse, and hemorrhage from the lungs. This last is often the first symptom that alarms the patient. Many important physical signs are present in tuberculosis. Tuberculosis of the bowels is very common in pulmonary tuberculosis, probably due to swallowing the infected sputum, but it is not common as a primary disease.

Treatment.— 1. *Preventive.*— This being an infectious disease, it is necessary to see that the sputum of all tubercular patients is received in suitable vessels and destroyed by burning. Patients should be instructed not to expectorate upon the floor, or on the sidewalks; in fact, a tubercular patient going down the street spitting right and left is more dangerous to the public than an insane man with a gun. Milk and meat from a questionable source should be rejected. A tubercular mother should not nurse her own child. Other members of the family may live above this dreadful disease by adopting careful habits of life, such as care in preventing colds, by taking a cold sponge or plunge bath, with

vigorous rubbing of the skin, daily, adopting a nourishing diet, regular time for meals, abundance of sleep in well-ventilated rooms, outdoor exercise, especially in the sunshine, systematic chest exercises, and avoiding all the excesses of life.

During the past year or two there has been a pronounced movement toward more outdoor sleeping even for people in good health. Any person with the slightest tendency to tuberculosis should, if possible, avoid sleeping in a close room. All sick people should sleep in a tent with a good, tight floor, or on a partly enclosed porch. Sleeping outdoors should be a pleasure, not an inconvenience, and is more important in the winter than in summer. Those who are not anxious to get well should sleep in the house.

Persons who have any tendency to tuberculosis should take special exercises to develop the chest and shoulder muscles, and they should eat abundance of nitrogenous foods and fats. This is indispensable. Those who are living upon a vegetarian diet are apt to overlook this point. The tissues can not be kept in a high state of resistance without these elements. Simply avoiding meat is not enough. It would be better to eat meat occasionally than to live upon an impoverished diet. However, a suitable and appetizing diet can be arranged without meat.



Take special exercises to develop the chest and shoulder muscles

2. *General.*— It is often impossible for tuberculosis patients to leave home or to make a change in climate. This being the case, the surroundings of the sick should be made the best possible. The patient should be encouraged to be outdoors in the fresh air, and to do light work if he is able. If too weak to walk, see that the patient

is out in the sun all day long on a cot or in a chair. This one procedure will do more good than all other things combined. When tuberculosis patients remain in closed, dark, damp, poorly ventilated rooms, and avoid every current of air, the chances of their getting well are very poor. Taking sun baths, or exposing the chest to the sun's rays daily, is of inestimable value. They should live in the open air, sleep in a tent or on the porch, summer and winter, and get used to the winds. The forces of nature are friends, not enemies.



If too weak to walk, see that the patient is out in the sun all day long on a cot or in a chair. The sun bath is of great value

3. *Diet.*— This is of great importance in the treatment of consumption. So long as the appetite remains good, the outlook is very hopeful. Tea, coffee, alcoholic drinks, pickles, and condiments should be avoided, for they will eventually destroy the digestion. All foods should be thoroughly cooked and appetizingly served. Nature's great larder offers an elaborate menu, adapted to the most capricious appetite, when mixed with common sense,— numerous cereals, thoroughly cooked breadstuffs, with well-cooked nut preparations, and fruits of all kinds. Each individual must select that which agrees best with his condition. Eggs, milk, cream, koumiss, buttermilk, should be freely used. If meat is craved, the best quality of beef should be selected. Some tuberculosis patients seem to be benefited by the use of meat, although Page and Densmore have had excellent results in their treatment without it.

4. *Hydrotherapy.*— Hydriatic measures have given the most satisfactory results in the treatment of tuberculosis. Cold water, judiciously applied, has lifted many a beginning consumptive from the pit of disease into which he had fallen to the plane of health and happiness. Water will stimulate the circulation, increase the action of the lungs, improve the appetite, facilitate the assimilation of food, increase the activity of the skin and kidneys, reduce fever, check night sweats, lessen cough and expectoration, and stimulate the nerve-centers.

First of all, copious water drinking should be encouraged. Drinking small quantities of water at brief intervals gives the best results. The best of all tonics and nerve energizers is the cold friction accommodated to the strength of the patient. This may be given two or three times daily. (See No. 184.) If the patient is too feeble to endure the treatment, begin with the dry hand friction, for a few days; then give with tepid water, gradually lowering the temperature of the water to 45°. When the patient reacts to the treatment quickly, the wet sheet rub may be given with the patient standing in a pail of hot water. Fomentations to the spine, to the chest, and to the liver are other helpful measures. (See No. 170.) These hot treatments should be avoided in the evening, so as not to encourage night sweats.

5. *Exercise.*— This in connection with hydrotherapy is of the utmost importance. A patient with a high fever each day should avoid exercise until the fever can be controlled, and the strength increased. Outdoor exercise should be persisted in, beginning very moderately and daily increasing the amount. Walking, mountain climbing, horseback riding, are all fine and exhilarating forms of exercise. The patient should exercise to the point of mild fatigue each day. Equally important with all the treatment is a hopeful, courageous spirit, and a determination to get well.

6. *Treatment of Special Symptoms.— a. Cough.*— Hot

water sipping at bedtime, hot and cold to the chest, fomentations, and protected chest pack. (See Nos. 170, 178.) The use of a nebulizer with proper solutions (see formula for nebulizer, page 340), or a teaspoonful of the compound tincture of benzoin placed in a pint of boiling water and the vapors inhaled through a funnel, will often give relief.

b. Night Sweats.— Sponge the body at bedtime with very hot water. Sponging with alum-water, or with equal parts of vinegar and hot water, will sometimes prevent this symptom. Cold friction daily. The following solution may be used to sponge the body at bedtime: —

Balsam Peru	15	minims
Formic acid	80	grains
Chloral hydrate	80	grains
Alcohol (pure)	3½	ounces

There is an old-fashioned remedy — the drinking of cold sage tea — which in a fair proportion of cases has been known to check night sweats.

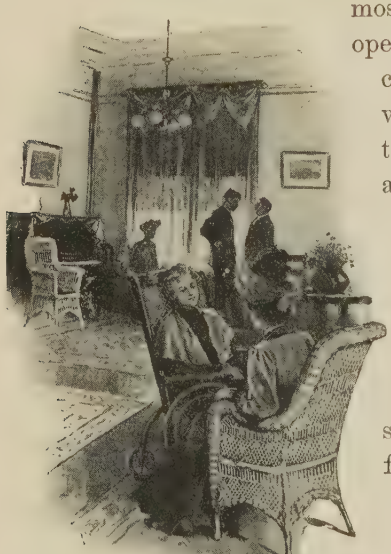
c. Fever.— If high, the patient should refrain from work or active exercise, but should be outdoors. Tonic measures, cold frictions. (See Nos. 184, 189, 190.)

d. Hemorrhage.— Rest in bed, semi-sitting position, cold compresses, 60°, to the front of the chest two to four hours, and a brief hot application between the shoulders. But two per cent of cases die from hemorrhage.

e. Loss of Appetite.— General treatment, outdoor life, exercise, hope, courage.

7. *Change of Climate.*— The best climate for consumptives is one that is dry, warm, and has the maximum amount of sunshine, combined with proper altitude. Many patients are benefited by a change of climate if the change is made early; but it does very little good after the lung begins to break down. The best climatic surroundings are found in Colorado, Southern California, Florida, Mexico, Arizona, and Southern Europe.

If patients could be induced to adopt proper natural measures at home, and could be taught the necessity of spending most of the time in the sun and open air, but few would need to change climates. The sick always receive better and more tender care at home than when among strangers.



8. *Drugs.*—Medicines, drugs, patent medicines, and "sure cures" for tuberculosis should be avoided. They only tear down. Cod-liver oil is useless. Arsenic and opium poison the system, and lessen one's chances for recovery.

BUBONIC PLAGUE

Synonyms.—Black death, Oriental plague, the plague.

From remotest antiquity this highly infectious disease has ravaged the countries of the East, and at times more than decimated the population of Europe. During a period of eight years in the fourteenth century twenty-four millions of the inhabitants of Europe were destroyed by it. At the present time thousands are dying in India, and it has entered Australia, and the island possessions of the United States, and even gained a temporary foothold in San Francisco.

Causes.—The exciting cause is a special germ discovered and described by Kitasato, a Japanese physician. This germ is found in the blood, glands, liver, spleen, and other viscera. It obtains entrance to the body through the respiration, water, food, and through injuries to the skin, such as fissures, abrasions, and insect bites. It is carried by rats and mice, both of which are quickly killed by the germ, and

their dead bodies become a menace to society. The germ is carried by fleas, flies, bugs, and ants, and their bite will inoculate a human being.

The bubonic plague is decidedly a filth disease. It thrives in densely populated districts and cities where sanitation is poor and filth abounds.

Symptoms.— Incubation two to seven days. Sudden onset with great severity. Marked prostration. Intense weakness is characteristic of the disease. There is splitting headache, pain in the back and legs, dizziness, pale skin, sunken eyes, dilated pupils, feeble voice, burning sensations in the nasal passages, throat, and stomach, nausea, vomiting, often diarrhea. In a few hours there is a severe chill, followed by high fever, 104° to 105°, severe headache, intense thirst, rapid respiration. One of the most characteristic features of the plague is the buboes, or suppurating glands, which appear on the second or third day. These appear in the groin, in the armpit, and in the neck. The bubo may reach the size of an egg or walnut, when it may rupture. It is at times very painful. With the appearance of the bubo the fever subsides. Hemorrhages from the mucous membranes are common. The large, painful glands in the groin cause the patient to sit up; and large glands under the arms, to hold the arms away from the body. The glands may not suppurate until the eighth day. The lips are dry and cracked, the tongue swollen and coated white, often changing to a mahogany brown or black. The liver and spleen are tender and swollen. The urine may be suppressed.

The nervous symptoms are marked, including pain, apathy, delirium, suicidal tendencies, walking on street as in a dream, staggers, loss of co-ordination, tremors, muscular twitching, and thickness of speech.

The temperature falls on the fourth day, and rises on the sixth or seventh day. The mortality ranges from forty to ninety-five per cent.

Treatment.— The patient should be isolated at once. Sustain the patient by means of short fomentations to the spine, followed by cold mitten friction or by dashing cold water on body, accompanied by rubbing. (See Nos. 170, 184.) Both procedures will quicken the skin circulation and stimulate the heart, preventing congestion of the internal organs. Cold compresses should be kept on the head. Fomentations may be given to the liver, followed by cold compresses. A wet sheet pack may be given when the fever is high. (See No. 185.) Free water drinking should be encouraged. Cold compresses to the groin frequently renewed may lessen the bubo formation. A fruit diet for a few days is beneficial. The first few days give daily hot enemas, and hot blanket pack for twenty to thirty minutes, followed by cold water sponging and friction, repeated three or four times a day. (See Nos. 195, 175, 184.)

Discharges and evacuations must be thoroughly disinfected with chlorid of lime or some other good disinfectant.

Fleas do not leave a dead body for twenty-four hours, and for this reason in many places the dead are not touched for that length of time. The most thorough disinfection must be enforced. If formaldehyd generators are used, the dead can be disinfected at once and buried or burned. This is an important preventive measure.

TRICHINOSIS

This disease is due to the *Trichina spiralis,* which is communicated to man by eating pork. The presence of trichinæ in pork is much more common than is generally supposed.

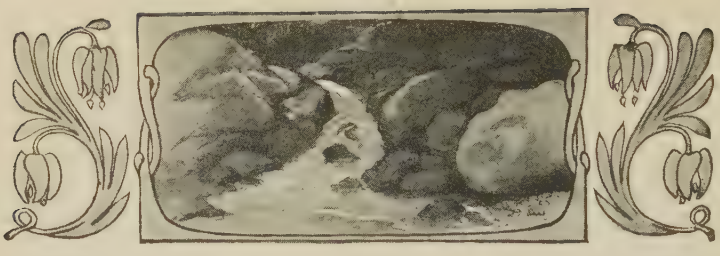
At a festival at Heltstadt, Prussia, at which one hundred and three persons partook of pork sausage, eighty persons were attacked with trichinosis, and twenty died within a month.

Symptoms.— Pain in the abdomen, loss of appetite, vomiting, sometimes diarrhea. These symptoms are not always

constant. About the seventh or ninth day there may be fever, inflammation of the muscles, pain on pressure or with movements, and swelling of the muscles. Painful and difficult breathing, because of the presence of the parasite in the diaphragm and intercostal muscles. Swelling of the face, stiffness of the muscles, sweating. The mortality is from three to thirty per cent. Death occurs most frequently about the fifth or sixth week.

This disease is frequently mistaken for typhoid fever, and even for cholera. Blood examination is important.

Treatment.— All meat must be discarded. Eliminative treatment is necessary, such as hot enemas, thorough cleansing of the intestinal canal, using a good dose of salts if necessary, or castor-oil. Hot full bath or hot blanket pack should be given to induce perspiration, followed by a cold friction bath to the entire body. Repeat three or four times a day. (See Nos. 195, 173, 175, 184.)



CHAPTER XXIII

Diseases of the Digestive System

SORE MOUTH — STOMATITIS

There are several varieties of inflammation of the mouth; viz., catarrhal, aphthous, ulcerative, parasitic (or thrush), gangrenous, and mercurial.

Causes.— Irritations produced by mechanical, thermal, or parasitic agents. Indigestion, gastro-intestinal disturbances. Most common in young children with bad hygienic surroundings, and in hot weather. Artificial feeding is a common cause.

Symptoms.—1. *Catarrhal.*—Increased flow of saliva, redness of mucous membrane, swelling, pain and crying when eating, restlessness, irritability, some fever.

2. *Aphthous.*—Symptoms same as above, with little round blisters appearing on cheeks, lips, and tongue, which break down and leave shallow ulcers.

3. *Ulcerative.*— Same symptoms. The gums of the lower jaw are especially affected, being swollen and red, and bleeding readily. Linear ulcers form on the gums, near the teeth, but rarely on the tongue or lips. Fever may be high. Eating is very painful. The breath is foul. The disease is sometimes called putrid sore mouth.

4. *Thrush, Soor, Muguet.*—This is due to a parasite, or fungus, called *Oidium albicans*, or *Saccharomyces albicans*. On examination of the mouth, small white elevations are noticed, which resemble small curds of milk. If brushed off, a raw surface is exposed.

Treatment.— Cleanse the mouth before and after eating. If the child is old enough, the mouth may be rinsed. If he is very young, cleanse the mouth by using a clean piece of cloth on the finger. The mouth may be cleansed with a solution of boric acid, or potassium chlorate, ten grains to the ounce of water; or boric acid in honey may be applied. If there are small ulcers, and they do not heal up quickly with a mouth wash of potassium chlorate, they should be touched with a two-per-cent solution of silver nitrate. This should be used with great care. It may be applied by means of a little absorbent cotton wrapped over one end of a toothpick.

Improve the general health by outdoor life in the sunshine and fresh air, and friction with salt water daily.

TONSILLITIS

Causes.— Common in the young. Exposure to cold and wet. Exhaustion, bad ventilation, inhalation of foul gases, improper or excessive use of the voice. One attack renders the person more susceptible to subsequent attacks. It is common in newly married persons, because of excessive sexual intercourse.

Symptoms.— Chilly feelings, aching pains in the back and limbs. Fever rises rapidly, often as high as 105° on the first day. Pain in the throat, increased by swallowing and talking, marked constipation. The voice may be nasal. The glands in the neck are often enlarged. One or both tonsils are swollen, usually one is larger than the other, and they may touch. The tonsils are red, large, and covered with thick mucus, or they may present yellowish spots.

Within a week the symptoms subside, but the tonsils remain large.

In quinsy, or acute suppurative tonsillitis, these symptoms do not subside, but increase. The constitutional disturbances are very great. Prostration is marked. The pain is intense, shooting into the ear and down the neck. The glands of the neck are enlarged. At the end of from four to seven days, pus forms, as a rule only on one side. This is often indicated by a distinct chill or chilly feelings. The abscess usually points toward the mouth. When it breaks, the patient experiences instant and great relief.

In diphtheria the false membrane is not only on the tonsil, but appears on the tissues in front of the tonsil, above it, and on the throat.

Treatment.— Rest in bed. Fruit diet. At the onset give an enema at 107°, followed by a hot leg bath and a cold compress around the throat. Foment the throat fifteen minutes, and follow with cold compresses changed every fifteen minutes for two hours. Repeat this treatment three times a day. At night put a cold compress on the throat, covered with two thicknesses of flannel. (See Nos. 195, 171, 186, 170.) Pellets of ice may be held in the mouth. Dip the moistened finger into soda and rub on the tonsil. This may be repeated every hour. One of the best gargles is listerine, one ounce; glycerin, two drams; and carbolic acid, one dram. Put one teaspoonful in half a glass of water, and gargle, or gargle peroxid of hydrogen one part to four parts of water. If the fever is high, sponge the patient with cold water several times a day. (See No. 179.) If pus forms, it is best to have a physician lance the tonsil. This affords immediate relief. If this is not possible, apply a hot-water bag over the throat, or keep up constant fomentations, and gargle a hot salt solution frequently. This treatment will hasten the breaking of the pus into the throat.

CHRONIC TONSILLITIS

The tonsils are enlarged, and frequently the tonsils in the upper part of the pharynx are enlarged, and are spoken of as adenoids.

SYMPTOMS.— Mouth breathing, snoring at night, night terrors are common, nasal voice, choking when eating, changes in the face, mouth, and chest. If of long standing, the child is dull, stupid-looking, and behind in his studies. Reading out loud is difficult, and the hearing is often impaired. Headache is common; also forgetfulness and inability to study. Putrid breath.

TREATMENT.— The tonsils should be removed. The importance of this operation is mentioned elsewhere.

Diseases of the Stomach

ACUTE GASTRITIS

SYNONYMS.— Acute gastric catarrh, acute dyspepsia, simple gastritis.

CAUSES.— This disease occurs at all ages, and is very common. It is usually due to errors in diet. Overeating, indigestible food, ice-cream, exposure to cold or wet, poisons, alcohol, acids, alkalies, gout, scarlet fever, all may produce acute gastritis. Alcohol is a very common cause among the drinking classes.

SYMPTOMS.— The mucous membrane of the stomach is red, swollen, and covered with mucus. The digestive fluids are diminished. Hydrochloric acid as a rule is absent. Lactic acid is often present. In mild cases there is a sensation of discomfort, uneasiness, distension of the abdomen, headache, nausea, bad taste in the mouth, coated tongue, but no fever. Vomiting gives great relief. In severe forms the symptoms are all more marked. Fever, 102° to 104°. Almost constant vomiting, pain in the abdomen, and great ten-

derness. Often fever blisters on the lips. Acute gastritis is usually of two or three days' duration.

Treatment.— Patient should take no food for two days. Vomiting should not be checked at first. Wash out the stomach with warm water, or drink several glasses of lukewarm or salt water. Patient may then swallow bits of ice. Fomentations over the stomach for ten minutes every two to three hours, followed by an ice-bag, or cold compresses. If the vomiting is excessive, place a tight binder, about twelve inches wide, around the waist, over a cold compress covering the stomach. At the onset give a thorough cleansing enema. If a child, give a large dose of castor-oil to empty the intestine. If the gastric irritation is marked, bicarbonate of soda or bismuth in fifteen-grain doses will give temporary relief. Koumiss or malted milk is the best diet when food is taken, then the white of an egg stirred in a cup of water, or a few teaspoonfuls of milk at a time.

CHRONIC DYSPEPSIA

Synonyms.— Chronic gastritis, chronic catarrh of the stomach.

Causes.— Improper diet, use of greasy and fried foods, excessive use of starchy foods, overeating, bolting food, improper insalivation, hasty eating at home and at lunch-counters, on the trains, and hotel living, drinking at meal-time, ice-water, iced teas, coffee, tea, irregular meals, late suppers, eating between meals, eating too frequently, pickles, mustard, vinegar, all condiments, tobacco, alcohol, decayed teeth, eating when exhausted or worried, excessive use of sweet foods, sugar, candy, rich foods, poorly cooked foods, drugs, ice-cream soda.

Symptoms.— The list is legion. These, however, are not all present in any single case of dyspepsia. Unpleasant taste in the mouth, coated tongue, which at times is very marked on the base of the tongue; at other times the tongue is slimy;

the breath is foul, often has a musty odor or the odor of molds, due to poison formed in the stomach; the edges of the tongue are tooth-marked; or the tongue may be broad, flat, and flabby; eructations of gas after eating; eructation of food, or belching; regurgitation of clear, watery fluid of a brackish taste; flatulency; sensations of oppression; distress and weight in the stomach; pain in the stomach after eating; "heartburn," due to fermentation, or to excessive hydrochloric acid; tenderness over the stomach; tenderness of the lumbar sympathetic nerve-centers on either side of the naval; tenderness on pressure over the solar plexus; nausea, vomiting, constipation, diminished hydrochloric acid; food remains a long time in the stomach; gases distending the stomach paralyze the muscular walls, causing dilatation and loss of muscular tone; stomach cough; palpitation of the heart, weak circulation, cold feet and hands, inactive skin, often sweating is difficult; severe headache, drowsiness and sleepiness after meals, irritability of mind, depression, melancholia, faultfinding, suspiciousness, neuralgic pains, pain between the shoulders and in the back, nervousness, tingling of the skin, numbness, dizziness, weakness, exhaustion, loss of flesh, pallor, impoverished blood, biliousness, loss of appetite, excessive appetite, extreme thirst.

The duration of the disease is variable. When the glandular portion of the stomach is once destroyed, it can never be repaired. A man with a weak stomach is a crippled individual. Many are in such a condition that they have to pursue a straightforward course, and can not turn to the right or to the left without paying the penalty anew.

Treatment.— 1. *Dietetic.*— Every dyspeptic must, to a large extent, be his own physician. His cure depends upon his own determination and perseverance in following exactly the dietetic and hygienic rules that are prescribed: —

a. Thoroughly masticate all food so that it may be perfectly mixed with saliva. Masticate, chew, and masticate!

b. Never eat in a hurry.

c. Have a regular time for eating.

d. Do not drink at meal-time, especially any cold fluid, and wait for one or two hours after meals before drinking much water.

e. Fruit should be eaten at the close of the meal.

f. The patient should stop short of the entire satisfaction of hunger, and long intervals should intervene between meals, at least six hours.

g. No late meals should be eaten, and if a third meal is taken, it should consist mostly of fruit.

h. Any great hunger between meals or at bedtime may be satisfied by eating some light fruit.

i. No meal should be immediately followed by active mental or physical exercise.

j. Eat with a happy heart, and a mind free of offense toward God and man. Relax at meal-time and avoid nervous tension. A contented disposition is a powerful digestive agent.

By observation and experience, patients will soon learn that certain articles of food disagree with them. Such articles should be banished from their dietary. Fat foods, highly seasoned foods, and all forms of hot fresh breads should be forever avoided.

Patients suffering from indigestion and slow digestion find frequently that starchy foods do not agree with them: that when they eat this class of food, there is considerable fermentation and gas formation. Potatoes especially, unless baked, produce fermentation. But if starch has been changed to dextrin by thorough baking, it is usually well borne. For this reason dry and well-baked foods, such as zwieback, granose, toasted wafers, and sticks are unexcelled as a diet for dyspeptics. The dry foods also insure thorough mastication and slow eating.

In the great majority of cases of slow digestion, and where

there is fermentation, milk should be avoided. It easily ferments, decomposes, and poisons the nerve-centers, producing a long list of symptoms. Good fresh buttermilk, or koumiss if not made by alcoholic fermentation, is well borne at times, but not for any long period. There are cases when an exclusive milk diet is highly beneficial.

Fruits are of great value in the treatment of digestive disorders. They are appetizing, aperient, easily digested, and their acids are cleansing and disinfecting both in the mouth and in the stomach, and the sugars of fruit are of great service in the body. In cases where the hydrochloric acid is in excess, acid fruits are not well borne, and are likely to increase the irritation of the already irritated mucous membrane. In such cases sweet and subacid fruits can be eaten, such as baked sweet apples, prunes, blueberries, baked bananas, figs, sweet oranges. Such fruit as strawberries, raspberries, peaches, grapes, apricots, plums, in fact, all the fruits in their season, supply an important place in man's dietary.

Nuts supply the fat required by the body, and entirely take the place of meat. Nuts that have been prepared by a process of malting are very digestible. Such nuts as almonds are best taken in the form of butter. Pecans and other like nuts should be masticated until a milky paste is formed. When there is a marked acidity of the stomach, as indicated usually by severe pain one or more hours after eating, avoid all acid fruits, and take two tablespoonfuls of pure olive-oil one hour after meals, or take two cups of hot water.

Where digestion is slow, and food remains in the stomach for several hours, it is a good plan to take a teaspoonful of the essence of pepsin with three or four drops of dilute hydrochloric acid after meals.

If pain in the stomach after meals, usually coming on about one hour after eating, is not relieved by drinking one or more cups of hot water, take half a teaspoonful of equal

parts of subnitrate of bismuth and bicarbonate of soda one or two hours after meals. Charcoal tablets with pepsin afford relief in many cases.

The variety of food at any one meal should consist of three or four foods. (See Chapter XVI, Food Combinations.)

2. *Hydrotherapy.*— Such measures should be employed as will increase the activity of every organ and raise the total vital resistance of the patient. Fomentations to the stomach, liver, and spine, hot and cold to the spine, hot and cold to the bowels, wet sheet packs, wet sheet rubs, wet hand rubs, cold friction, salt rub, and the shallow bath. (See Nos. 170, 189, 185, 184, 190.)

3. *Exercise.*— Outdoor occupations, as gardening, walking, rowing, and bicycle riding, are all excellent, and should be systematically and regularly pursued. The abdominal muscles should especially be developed. Correct standing and sitting positions should be cultivated. It is well for patients who suffer from an excess of acid formation, to rest half an hour after meals. Breathing exercises taken in the fresh air are of great importance. Proper dress is very necessary to good digestion.

Passive exercises are of great benefit, such as cannon-ball massage, and kneading of the bowels.

4. *Electricity.*— Electricity is very valuable in gastritis, but it should be given by a physician or a trained nurse. For pain in the stomach and bowels use galvanism, positive pole over the abdomen, negative pole to the back. Give ten to fifteen milliampères for ten minutes. Faradic electricity to the abdomen and to the muscles is a good tonic.

5. *Mental Attitude.*— The mental attitude of the patient has much to do with recovery. Those who are morbid, and spend much of their time in introspection, and recounting their symptoms and possibly searching for some new ones each day, will make slow progress. A despondent view of their condition will keep them in the valley of despair.

TREATMENT OF SPECIAL CONDITIONS

1. *Lack of Appetite.*— Exercise, cold morning plunge, breathing exercises, abundance of sleep.

2. *Sleeplessness.*— Neutral bath at 95° for half an hour, dry, and go to bed. Wet sheet pack for twenty to thirty minutes, or just to the point of perspiration. Large fomentations to the spine may be given at bedtime. (See Nos. 174, 185, 170.)

3. *Constipation.*— (See Constipation.)

4. *Fermentation and Pain.*— Fomentations over the stomach, cold compresses, drinking hot water, drinking charcoal water made from grains, eating charcoal tablets, or the taking of bicarbonate of soda or subnitrate of bismuth in twenty-grain doses an hour after meals, or, better, twenty grains of calcined magnesia. (See Nos. 170, 186, 169.)

5. *Cold Feet.*— Hot and cold spray to the feet, or placing them alternately in water as hot as can be endured, and then quickly changing to cold water. Or place the feet in cold water and rub them vigorously with a rough cloth at the same time. Cold friction in the morning.

NERVOUS DYSPEPSIA

Symptoms.— The appetite is very capricious; at times it is inordinate, then again it may be lost. The patient has a craving for unnatural articles of food. Vomiting is quite common. The acidity of the gastric contents is often excessive. Pain is a prominent symptom, and may be quite independent of taking food. Nervous dyspepsia is often associated with hysteria and neurasthenia. At times when the stomach contains no food, there is a large secretion of a highly acid fluid, which distresses the patient. Headache may be intense; dizziness is common.

For the treatment of nervous dyspepsia, see the directions for treatment of Chronic Dyspepsia.

NEURALGIA OF THE STOMACH

Synonyms.— Gastralgia, gastrodynia.

This affection occurs mostly among women, and is associated with the menstrual function, nervous temperament, overwork, constipation, worry, and often occurs in nervous dyspepsia when there is an excessive formation of hydrochloric acid. This disease may be due to some organic change in the sympathetic ganglia, closely associated with the spinal cord. The pain of biliary colic (due to the passage of gall-stones), or of appendicitis, not infrequently leads to a mistaken diagnosis of gastralgia.

Symptoms.— Sudden agonizing pain seizes the patient in the stomach, and radiates around the ribs to the back. The attacks come on most frequently at night, near midnight. Vomiting is not common. The taking of food in most cases relieves the pain, likewise moderate pressure. The attacks may last for hours or only a short time, and they may occur repeatedly for a day or more and then subside, coming at intervals of weeks or months.

This disease is often mistaken for ulcers of the stomach. In the latter disease, the pain is more constant, is increased by eating, and there is great local tenderness and very often hemorrhage from the stomach.

Treatment.— Regular habits are necessary. Tea, coffee, tobacco, alcohol, and candy must be avoided. It is useless to take treatment if these articles are not avoided by the patient. Food should be taken in moderation. The general treatment is the same as in chronic dyspepsia. During a paroxysm very hot fomentations may give some relief. But the hot half-trunk pack (No. 177) is more effective if it is supplemented with a hot-water bag directly over the stomach. Drinking several cups of hot water in quick succession is important. This can never do harm, and it often affords much relief.

ULCERATION OF THE STOMACH

CAUSES.— Five per cent of all post-mortems reveal gastric ulcers. Most common in females between fifteen and forty. Overwork, dietetic excesses, impoverished food, chlorosis, and poor blood are causes. The ulcers are most frequently found on the back wall of the stomach, and at times may be an inch in diameter. Among men the most common cause is excessive drinking.

SYMPTOMS.— As a rule the patient has had stomach trouble for some time. Nausea and vomiting are present in a large proportion of cases. Hemorrhage occurs in over one half of all cases, and is due to an erosion of a blood-vessel, caused by the ulcer extending into the coats of the stomach. Pain is a constant feature. It is gnawing and burning in character. As a rule, the pain is increased by eating. Local tenderness is marked. There is loss of weight and anemia. In gastric ulcer the acidity of the stomach is increased.

TREATMENT.— Rest in bed. At the time of hemorrhage the patient should be placed perfectly at rest, and nothing taken by mouth for twenty-four hours or more, except cracked ice and ice-water. If there is but little pain, and the hemorrhage is not present, after the second day give a few teaspoonfuls of ice-cold milk every three hours, and increase from day to day. By the end of the first week give an egg-nog ice-cold three or four times a day. If the hemorrhage is repeated or frequent, rectal feeding is necessary. When hemorrhage is severe, and it is not advisable to give food or water by mouth, give the patient twice a day an enema of a pint of water containing a teaspoonful of salt. (See No. 196.) When food is finally taken by mouth, it should be unirritating and very digestible, such as malted nuts, or malted milk, buttermilk, koumiss, thin gluten gruel, and zwieback; this should be well masticated. Water should

be drunk freely during the interval between meals. The pain is relieved by fomentations, the ice-bag, and the alternating hot and cold half-trunk pack. (See Nos. 170, 199.) If the vomiting is severe, a thorough stomach wash is the most successful measure, followed by a little alkaline water, such as soda, or give half a teaspoonful of bismuth.

If perforation of the wall of the stomach occurs, the outlook is doubtful. Recovery is slow, from three to six months.

CANCER OF THE STOMACH

Causes.— In the last forty years, cancer has increased with wonderful and alarming rapidity. Fifty years ago one death in England out of every one hundred twenty-seven was due to cancer; to-day one death out of every twenty-two is due to this malignant and fatal disease. The proportionate mortality from cancer now is several times what it was half a century ago. Heredity has but little influence. The increase of cancer has kept pace with the increased consumption of meat. Dr. Roger Williams, of the London *Lancet,* says: "Statistics show that the consumption of meat has for many years been increased by leaps and bounds, till it has reached the amazing total of one hundred thirty-one pounds a head per year, which is more than double what it was half a century ago." Pork eating is a cause of cancer. Dietetic errors and protracted dyspepsia are important factors. No doubt the elaboration of poisons in the alimentary canal produces irritation of the stomach and liver, and is a causative factor in the production of cancer. Cancer is very rare among the nations whose people subsist largely upon carbohydrates and other vegetable foods.

Cancer is most common between the fortieth and fiftieth years. It is not common under forty years of age, and very rare under thirty. It is quite common between fifty and sixty.

Symptoms.— Gradual failing health, loss of appetite,

indigestion, loss of strength and weight, pain of a gnawing, burning, lancinating character, nausea, "coffee-ground vomit," emaciation, pallor, marked anemia, swelling of the ankles, and the absence of hydrochloric acid in the stomach in the majority of cases. On examination a tumor can be detected if the disease is advanced.

The disease is absolutely fatal, and runs a course of from six months to two years.

Treatment is only palliative. An operation should be performed if a diagnosis is made early; for the patient has nothing to lose, and much to gain.

DILATATION OF THE STOMACH

Synonym.— Gastrectasis.

Causes.—General weakness, overeating, drinking at meals, excessive drinking at any time, alcoholism, beer drinking, indigestion with fermentation, improper dress, incorrect positions, narrowing of the pylorus by ulceration or by cancer.

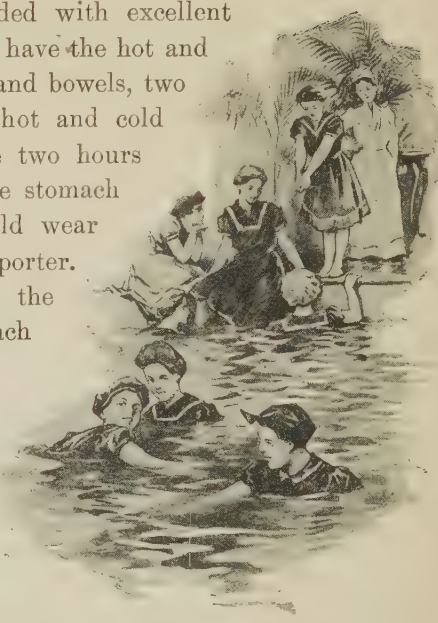
Symptoms.— These are variable. Often not determined except by careful examination. Long-continued digestive disorders, excessive thirst, especially after eating, inordinate appetite, vomiting at intervals, often of food eaten several days before, excessive fermentation, slow digestion, sensation of weight in the stomach, constipation, dry skin, loss of strength and flesh.

In dilatation of the stomach, the lower border of the stomach frequently extends below the naval; in normal conditions it is two inches above the naval. Actual dilatation can be determined only by careful physical examination.

Treatment.— Carefully regulated diet. Food should be taken in small quantities. (See Gastritis.) Avoid fats, butter, and oils for a time. If the food remains in the stomach from one meal to another, the stomach should be washed out with a stomach tube. Lavage at least three times a week for a short time would be advisable. In fact, a daily washing of

the stomach may be attended with excellent results. The patient should have the hot and cold douche to the stomach and bowels, two to four minutes daily, or hot and cold compresses, special massage two hours after meals, replacing of the stomach by manipulation, and should wear a suitable abdominal supporter. Electricity will develop the muscles of both the stomach and the abdominal wall.

Lifting the legs, body bending, walking, swimming, and rowing,— any exercise that will strengthen the abdominal muscles,— will be of great help in overcoming this condition.



Swimming strengthens the abdominal muscles

Diseases of the Intestines

INTESTINAL COLIC

Causes.— Indigestible and irritating food, fermentation, accumulation of feces, cold, reflex pain from the ovaries and uterus, poisoning from lead, and obstruction of the intestine.

Symptoms.— Severe paroxysms of pain of variable duration around the naval. In lead colic there is a blue line on the gums; in renal colic the pain radiates down to the penis and testicle, and blood is found in the urine; in biliary colic the pain radiates from the liver on the right, to the back and under the right shoulder-blade, and is sometimes followed by jaundice.

Treatment.— Hot enema, 110°, and fomentations to the abdomen fifteen to twenty minutes, followed with a dose of

castor-oil or of magnesium sulphate. The latter is the chemical antidote to lead-poisoning, and should be used freely. The hot trunk pack for thirty minutes followed by the wet girdle is another good treatment. If due to errors in diet, an abstinence from food for twenty-four hours is recommended. (See Nos. 195, 170, 177, 188.)

DIARRHEA

Synonym.— Acute catarrhal enteritis.

Causes.— Improper food, overeating, unripe fruit; in children and infants it is common during the hot summer months, and is very frequent among bottle-fed children; dirty nipple, unclean bottles, sour bottles, changes in weather, poisons from the decomposition of milk and other foods, germs, change in drinking water, nervous influences, over-exercise of the abdominal muscles, infectious disease, such as typhoid fever, cholera, dysentery, tuberculosis.

Symptoms.— Diarrhea, frequent stools, containing undigested food, or curds of milk, offensive, usually of a yellow or greenish color; colicky pains. In children frequently the pain is intense and the temperature is 104° or 105°. In the adult the fever is not high, as a rule. In the child the legs are usually drawn up.

Treatment.— *Adults.*— Rest in bed, fasting for twenty-four to thirty-six hours, a laxative such as a tablespoonful of castor-oil, which will empty the small intestine of irritating food; this should be followed by a thorough cleansing enema. Fomentations to the abdomen fifteen minutes, followed by cold compresses. (See Nos. 170, 186.) Free water drinking, but avoid very cold water. If the diarrhea is constant, after twenty-four hours, give hot enema at 110°, and bismuth twenty to thirty grains, or a tablespoonful of chalk mixture obtained at the drug-store, given after each movement, will check too active secretion; or take a tablespoonful every three hours. The diet should be simple

gruels, gluten or starch, or barley water. Avoid milk, sugar, vegetables, or any fruit with seeds or a woody pulp. After a day or two blackberry or huckleberry juice may be allowed, with well-masticated zwieback, and cereals.

Children.— Withhold food for twenty-four hours; then give barley water, made by cooking two tablespoonfuls of barley in a quart of water for two or three hours, straining, and adding a little salt. This should be kept on ice during the intervals between feedings. No milk should be given a child while the diarrhea is severe. Absolute cleanliness in all things is exceedingly essential. All rubber nipples and bottles should be boiled and kept on ice. The milk should be sterilized by heating it in a double boiler to 165° for fifteen minutes. The milk should be diluted with water (equal parts), or with lime-water (one-fourth part). If taken at the beginning, castor-oil in free doses will abbreviate the attack. This should be followed by a thorough cool enema, 80° to 90°, if the temperature is high. A chalk mixture obtained at a drug-store should be given in teaspoonful doses every three hours, after the first day.

Frequent bathing of the body with cool water is refreshing and sedative. Apply cold compresses to the head. See that the ventilation is good, and that the child is not too warmly clad. After the first twenty-four hours, the child may be fed the whites of two eggs in a pint of water, thoroughly mixed, and strained through a cloth. Give as much as he will take. A full bath at 95° will reduce the fever and quiet the nerves. Keep the feet warm.

During the hot months, diarrhea often continues for weeks at a time. If this is the case, no milk should be given. Give barley water, barley gruel, and the white of egg in water as long as the child is nourished by these foods. At best he will tire of them. Then give equal parts of barley gruel and broth. A child may be kept on this diet for weeks, until the intestinal trouble is corrected.

CHOLERA INFANTUM

This is an acute disease of childhood, characterized by high fever, severe vomiting and diarrhea, and symptoms of collapse, due to inflammation of the intestine.

CAUSES.— It often follows diarrhea. Hot weather, faulty feeding, teething, and unhygienic surroundings are the most common causes.

Cholera infantum is most common during the months of July and August, and is largely among bottle or artificially fed babies. Not only does heat increase the tendency to fermentation and putrefaction, but it also has a prostrating influence upon young children, and so makes them more susceptible to infections and auto-intoxication.

SYMPTOMS.— Onset may be gradual if it follows a simple acute diarrhea; on the other hand, it may be very abrupt, and characterized by vomiting, purging, and collapse. The vomiting is incessant; the stools are frequent and profuse, thin, watery, and have a musty odor. The external temperature may be low, while the rectal temperature is high. The fontanels are sunken, likewise the eyes; the cheeks are hollow, the features are pinched. At first the child is restless, but later he is stupid, or may have convulsions. The skin is cold.

TREATMENT.— Perfect rest, cool room, country air if possible; cold-water drinking, barley water for the first day or two, and albumen water, such as the white of egg in a cup of water. Later, thin gruels, such as gluten gruel, may be given. No milk should be allowed for several days. Avoid whisky and soothing sirups. The stomach of a small child may be washed out by a nurse or physician by using a large-sized rubber catheter and a glass funnel. Cleanse the bowel with injections of hot water, 105°; or cold water, 85°, may be more acceptable. To make this effectual, elevate the hips of the child, and pass the water high up in the bowel by means of a flexible catheter. Apply fomentations to the

abdomen every three hours, and during the intervals put on the cold compress, 70°, cover with flannel, and change every hour. Keep the feet warm. If there are symptoms of collapse, place the child in a warm bath at 100°, or give a hot blanket pack for ten minutes. During the first day give water to drink, even if vomited at once. If the diarrhea continues, give a teaspoonful every three hours of the following mixture: Salol, three grains; subnitrate of bismuth, seventy-five grains; chalk mixture, two ounces.

CHOLERA MORBUS

Causes.— Green apples, other unripe fruits, hot weather, irritating foods, germs.

Symptoms.— Sudden onset, colicky pains in stomach of an intense nature, vomiting, purging, watery stools, some fever, very great prostration, intense thirst, cold clammy skin, rapid weak pulse.

Treatment.— Rest in bed, wash out the stomach, and give large enema, 110°; apply fomentations to abdomen, followed by cold compresses, 60°, for two hours; the patient may swallow bits of ice, after all food has been vomited or washed out of the stomach. The loss of fluid from the blood may be restored by giving large injections of water into the bowel, the patient retaining it if possible. At bedtime put on abdominal compress. (See Nos. 170, 186, 195, 188.)

APPENDICITIS

This is an inflammation of the vermiform appendix, which is located near the groin, on the right side of the abdomen. To-day it is considered one of the most serious intestinal disorders.

Causes.— Fifty per cent of cases occur under twenty years of age. This disease is not due to grape seeds or apple seeds lodging in the appendix, but to catarrhal inflammatory conditions of the intestine extending into the canal of the

appendix. Intestinal catarrh is an important predisposing factor in the production of the disease. There are always present in the intestine pus germs and the *Bacillus coli communis,* both of which produce inflammation when the vitality of the appendix is reduced. Appendicitis is much more frequent in men, probably due partly to the fact that the blood supply to the appendix is poorer, there being fewer arteries going to this organ, than in women. Straining, heavy lifting, and exposure are causative factors. Injuries or blows may cause appendicitis. Fecal matter may gain entrance into the appendix, irritate the mucous membrane, and produce inflammation.

Symptoms.— Onset is rapid. Pain on the right side of abdomen, low down, and it may radiate toward the naval, and is increased by every movement. The pain is relieved by drawing the right knee up toward the body. Marked tenderness, a swelling may be noticed on examination, nausea and vomiting, fever of an irregular type, constipation is usually marked.

Course.— In mild cases the symptoms gradually subside. In many cases an abscess forms, and is very apt to perforate into the abdominal cavity.

Every case of appendicitis is dangerous, for no one can tell whether an abscess will develop or not. The majority of cases will recover without an operation, if taken in hand at the very start. There is a great tendency for appendicitis to recur, and some one attack is likely to prove fatal. On the whole, to be on the safe side, an early operation is advisable. In the hands of a good surgeon the mortality is very low. Send for a physician at once.

Treatment.— Prompt, energetic measures are necessary. Absolute rest must be insured. Wash out the stomach. No food should be taken for several days. No cold water should be taken by mouth; but plain enemas, with a teaspoonful of salt to the quart of water, may be given, and retained.

Absolute rest of the bowel is an important part of the treatment. Purgatives should not be given unless at the very beginning of the onset. The constipation is best relieved by giving large warm enemas with little force. (See No. 195.) At the very onset of the disease an ice-bag or cracked ice should be placed over the seat of pain, combined with a hot leg pack for twenty minutes every four hours (see Nos. 199, 176), and alternating every two hours with fomentations for fifteen minutes to the abdomen. This should be maintained for twenty-four hours. Then large cold compresses wrung out of water at 60° should be applied, changing every fifteen minutes, alternating with fomentations every two hours. (See Nos. 170, 186.) When fomentations seem to increase the pain, and a small area of the skin is especially sensitive, it is a good indication that pus is forming. A blood examination is important.

For the fever and as a supporting treatment, give cold friction at 60°, avoiding the abdomen, every three or four hours.

As it is a disputed question among the leading surgeons whether to operate always in acute appendicitis after the second day, we shall not attempt to settle this much-debated question. Suffice it to say that a great majority of cases will recover if prompt measures are taken.

ACUTE PERITONITIS

This is an inflammation of the delicate membrane that lines the entire abdominal cavity, and covers the intestines, stomach, and liver.

Causes.— Injuries, blows, wounds, such as gunshot wounds, or stabs; following surgical operations; following childbirth; following appendicitis, gall-stones, and the passage of germs through the walls of the intestines. Or it may be due to disease of the ovaries.

Symptoms.— Intense abdominal pain and tenderness, in-

terfering often with the breathing, as the action of the diaphragm increases the pain. The abdominal wall is markedly distended and tense. The limbs are drawn up to relieve the pain. The pulse is rapid; temperature, 102° to 105°. Vomiting is an early symptom; the vomit is yellowish, greenish, dark, and finally may have a fecal odor. The face is pinched, eyes are sunken; there is usually constipation.

Acute diffuse peritonitis usually terminates in death.

Chronic peritonitis is usually tubercular. There is, as a rule, but little fever, and pain is not marked. Emaciation and loss of strength are marked. Fluid may or may not collect in the abdominal cavity.

Treatment.— The first indication is to relieve pain. This is best accomplished by fomentations for fifteen minutes every two hours, followed by compresses wrung out of ice-water and changed every fifteen or twenty minutes. (See Nos. 170, 186.) These applications should not be made burdensome by being too heavy. The vomiting may be relieved by swallowing bits of ice, or by the application of the ice-bag over the stomach. If this is not effectual, give tablespoonfuls of hot water frequently. (See No. 199.) This treatment will also relieve hiccough. The temperature may be reduced by means of cold water sponging, or better by cold friction. (See No. 184.) If the patient passes into a state of collapse, the strength can best be supported by keeping heat applied to the extremities, hot and cold to the spine, and cold friction. Constipation is best relieved by means of cold enemas, 80°. Saline purges are recommended at the start by some surgeons. All food should be withheld for from twenty-four to thirty-six hours. When food is taken, it should be of the blandest character, such as plain gruels, gluten, barley water, and fruit juices. If there is vomiting, give nutritive enemas. (See No. 196.) By mouth, food and water should be given in very small quantities, hence frequently. Operation may be necessary.

CONSTIPATION

Synonyms.— Costiveness, obstipation.

This is not a disease, but a symptom. However, it is so frequent to-day that it will be here considered by itself. In constipation there is a prolonged retention of feces within the bowel. Just what constitutes a regular condition of the bowels is difficult to state. In the majority of normal persons the bowels move once a day. The usual time for stool is after meals, for the ingestion of food excites peristaltic movements of the colon, and these in turn excite the centers for defecation. The desire to go to stool is not made known until the feces pass the upper part of the rectum, when the special nerves governing this mechanism are excited by the on-moving mass.

Causes.— These are numerous. Lack of muscular tone in the bowel, improper mastication of food, overeating, too concentrated food, tea, coffee, meat diet, alcohol, irregular habits of attending to the calls of nature, sedentary life, lack of exercise, riding on the cars, loss of sleep, weakness of the abdominal muscles, dyspepsia, disease of the liver or heart, tumors, strictures, acute fevers, hysteria, neurasthenia, frequent pregnancies, lack of secretions, anemia of the bowel, poisoning of the sympathetic nerve-centers, excessive perspiration on hot days, insufficient water drinking, hemorrhoids, and fissure of the anus. The excessive use of drugs and patent medicines is a prolific cause of constipation.

In infants constipation is common. It may be an inherited weakness, or due to diet and local troubles. Some babies do not have a natural movement for months, and yet they thrive. As a rule, the nature of the food is the cause. Deficiency of fat is considered a cause by some.

Symptoms.—Debility, loss of appetite, coated tongue, foul breath, various pains, neuralgia, backache, headache, mental dulness, depression, insomnia, in men nocturnal emissions,

in children nocturnal enuresis, or wetting the bed. Infants are usually very irritable and cross if the bowels are irregular, and become perfectly amiable as soon as the bowels move.

Treatment.— I will enumerate the various lines of treatment that may be pursued in constipation. All may not be necessary in any one case.



Rowing is an excellent exercise

1. Dry diet, thorough mastication, slow eating, no drinking at meal-time. Drink one or two hours after eating. Eat freely fresh and stewed fruits,— apples, prunes, figs, peaches, oranges, bananas, blueberries. All sweets are laxative.

2. Free water drinking at bedtime, and one or two glasses of cold water half an hour before breakfast.

3. Outdoor exercise. Walking, horseback riding, rowing, and bicycling are all excellent forms of exercise.

4. A regular time for going to stool. This should be persisted in, even if one has to wait an hour or more. Avoid straining. After breakfast is the most desirable time.

5. Cold plunge or a cold sponge bath on rising in the morning.

6. Manual massage to the abdomen, and Swedish movements.

7. Hot and cold douche to the abdomen, especially over the colon, given with pressure, or hot and cold compresses fifteen minutes daily. (See No. 186.)

8. Wear the moist abdominal girdle at night. (See No. 188.)

9. Electricity, faradic current; apply one pole to the anus and the other over the abdomen, following the colon. The sinusoidal current is also very effectual, also mechanical vibrations.

10. The introduction of an ichthyol suppository into the rectum at bedtime.

11. The injection of two to four ounces of sweet-oil into the rectum with the hips elevated, at bedtime.

12. The hot and cold perineal douche, or hot and cold rectal irrigation.

13. A daily enema of water at 70°, beginning with a quart, retaining for a few minutes. Gradually reduce the water to a cupful, and the temperature to 45°. This is a powerful intestinal tonic.

14. Hot and cold douches to the liver, or cold compresses applied over the liver area. (See No. 186.)

15. A happy frame of mind and a proper mental attitude.

16. In case a cathartic is required for chronic constipation, the aromatic cascara sagrada preparation is the best. Hunyadi water is also quite efficient, and harmless.

HEMORRHOIDS, OR PILES

These are formed by the enlarging of the veins in the lower end of the rectum. Blind piles are the external piles, while bleeding piles are internal.

CAUSES.— Constipation, inactive liver, sedentary life, over-

eating, condiments, especially pepper, alcohol, pregnancy, and purgatives.

Treatment.— (See Constipation.) Correct bad habits, and take outdoor exercise moderately. If any laxative is necessary, take sulphur in five- to ten-grain doses, or cascara in like doses.

For painful external piles, ice-cold compresses or the anal douche give relief, and reduce the congestion. (See Nos. 186, 191.) When hemorrhoids are very painful, move the bowels with a warm enema, and follow with ice-water. Above all, the anus should be kept very clean. Wash with cotton saturated with the following: Tannin, one teaspoonful; water, one pint. Boas recommends the following ointment: —

℞ Chrysarobin ..... 10 grains
Iodoform ..... 4 grains
Extract of belladonna ..... 10 grains
Vaselin ..... 1 ounce
M.
Sig.: To be freely applied several times a day.

I have had good results with the following: —

℞ Extract hamamelis ..... 10 grains
Potassium bromid ..... 5 grains
Extract belladonna ..... 10 grains
Vaselin ..... 1 ounce
M.
Sig.: Apply two or three times a day.

For internal and bleeding piles inject a few ounces of ice-water daily, introduce an icicle, or two tablespoonfuls of lime-water. Piles that protrude after a movement of the bowels should be cleansed and gently pushed back. If they are swollen, and reduction is difficult, apply ice or cold compresses, oil, or lubricate with vaselin, and push back.

The following suppository gives good results: —

℞ Ichthyol ..... 5 grains
Witch-hazel ..... 5 minims
Canada balsam ..... 5 minims
Camphor ..... 2 grains

Oil erigeron ..... 5 minims
Theobromin.....q. s. for one suppository
M.
Sig.: Insert one into the rectum at bedtime.

When pain is severe and bleeding is marked, go to bed for a day or two, and apply cold compresses to the perineum. For severe pain apply fomentations. Avoid straining at stool. When bleeding is severe, take a teaspoonful of the pure extract of witch-hazel three times a day. This may be continued from four to six weeks. Persons thus afflicted should avoid bicycle and horseback riding, and all violent exercise.

Diseases of the Liver

CATARRHAL JAUNDICE

Synonym.— Icterus.

This is a disease due to the obstruction of a common bile duct, and is characterized by a yellow pigmentation of the skin and of all the tissues.

Causes.— Intestinal catarrh, gall-stones, exposure to cold and wet, errors in diet, malarial fever, typhoid fever, portal obstruction, heart-disease, diseases of the blood, poisons, tumors.

Symptoms.— The white of the eye is tinted yellow, and the entire skin sometimes takes on a bright yellow color. Gastric disturbances are often marked. Sometimes there is a slight fever. The stools are clay-colored, the urine is dark, and contains bile pigments and acids. The skin itches intensely at times. There may be headache, dizziness, irritability of mind, stupor, insomnia, and objects may appear yellow to the sight. The duration is from four to eight weeks.

Treatment.— The diet should be free from fats, and light in nature. Eat thoroughly cooked grains, toasted breads, skimmed milk, koumiss; drink freely of water and lemonade. Enemas for constipation; eliminative treatment

to get the poison out of the body. Hot packs, fomentations to the spine, the warm full bath, 102°, the neutral bath at 95° for sleeplessness, and also to increase the skin and kidney activity, fomentations over the liver, wet sheet packs, using water at 60° to 70°. If the itching is intense, bathe the skin with hot soda-water or rub on carbolized ointment. Hot and cold compresses to the abdomen and cold rectal injections, preceded by an enema at 110°. Give fomentations to the spine, and cold friction three times a day. (See Nos. 195, 175, 170, 173, 174, 185, 183, 184.)

GALL-STONES

Synonym.— Biliary colic.

Causes.— Sedentary habits, lack of exercise, highly seasoned foods, meat diet, improper dress, tight bands about the waist; hence frequent among women. It is most common between thirty-five and forty-five. Lack of water drinking, and faulty elimination. It is a common sequel to typhoid fever.

Symptoms.—A very sudden and excruciating pain in the region of the liver, radiating to the right, and often felt under the right shoulder-blade. The attack frequently comes on after eating. It may last several hours, or be frequently repeated for two or three days. During the attack the patient may vomit, have chills, feeble pulse, and cold, clammy sweating. Jaundice of moderate degree may appear in two or three days.

Gall-stones are frequently mistaken for neuralgia of the liver, renal colic, lead-poisoning, or even appendicitis, and neuralgia of the stomach. Often the patient comes to the physician, and says he has attacks of indigestion.

Treatment.— Very hot fomentations, continued for one or two hours, to relieve the pain and to relax the bile ducts. The hot trunk pack could also be used, and if necessary may be persisted in for several hours. (See Nos. 170, 177.)

As a stone is often very slow in passing through the ducts, short hot applications are ineffective. Keep the extremities warm. Daily fomentations alternating with cold compresses will relieve the congestion of the liver. Give cold friction once or twice a day. A surgical operation is necessary in the large majority of cases to insure a cure. The sooner this is performed, the better.

The diet should consist entirely of fruit for a few days, with copious water drinking and lemonade. Sugar and meat should be avoided. A large enema should be taken daily. Give olive-oil in tablespoonful doses several times a day.

CONGESTION OF THE LIVER

SYNONYMS.— Active hyperemia, passive hyperemia.

CAUSES.— Acute congestion is usually due to some error in diet, such as overeating, improper combinations, the excessive use of alcohol, or acute fevers, especially typhoid and malarial. Chronic congestion is usually due to chronic diseases of the heart, lungs, stomach, and kidneys.

SYMPTOMS.— Enlargement of the liver, with a feeling of weight or heaviness. There is pain or tenderness over the liver. The tongue is usually coated, the breath foul, head ache is common, and there may be nausea and vomiting.

TREATMENT.— Cold compresses to the liver, changing every fifteen minutes, alternating with fomentations every two hours, hot and cold douches, hot and cold trunk pack, cold friction, hot towel rubs, wet sheet packs. Empty the bowels with a dose of salts, and follow with a cleansing enema. If there is biliousness, use the stomach tube. The hot foot bath will relieve the headache and draw the blood from the liver. (See Nos. 186, 170, 191, 189, 184, 185, 195, 171.)

The diet should be light, and consist mostly of fruit for a day or two, with free water drinking. In the chronic form a periodic fast of two or three days will be beneficial.

CHAPTER XXIV

Diseases of the Nose, Throat, and Chest

COLD IN THE HEAD

Synonyms.— Acute rhinitis, coryza, acute nasal catarrh.

Symptoms.— Repeated sneezing, chilliness, or shivering, fulness in the head, headache, muscular pains, slight fever, dry skin. The nose feels uncomfortably dry because of the local congestion, and this in turn necessitates mouth breathing. The sense of smell and taste are impaired, the voice acquires a nasal tone, the eyes are frequently congested. In the course of a few hours a thin, watery mucus flows from the nose; later this irritates the nose and lip, and makes the use of the handkerchief painful. On the second or third day the secretions are muco-purulent. A cold usually runs a course of from seven to ten days.

A cold, whether it be in the head, in the throat, or on the lungs, is a congestion of the mucous membrane of these parts, due to a sudden chilling of the skin, either general or local. Because of the exhaustion of the nerve-centers, the skin fails to react, and the equilibrium of the circulation is broken, so that one part contains too little blood, while some other part has too much. That region of the body in which there is the least resistance suffers. This is usually some part of the mucous membrane.

Colds are the earliest and simplest manifestation of disease, and are a warning that more severe measures will soon follow if the health is not cared for, and the body put in a proper state of resistance.

Colds go hand in hand with exhaustion of the vital forces, and may be followed by pneumonia, pleurisy, attacks of gastro-intestinal indigestion, diseases of the kidneys, the liver, the pelvic organs, and the nerves.

There are many conditions that render one susceptible to colds. Persons who have engaged in vigorous exercise, perspiring freely, even saturating the garments next to the skin, and who then remain inactive, sitting down or standing in the cold or wind, have a good opportunity to "catch a cold." The exposure of a small portion of the body, like the back of the neck, the surface between the shoulders, or the chest, to a "blade of cold air" from a keyhole, a window crack, or a window let down from above, is a frequent cause of colds. If we could become as accustomed to "facing the wind" with the back of the neck as we are with the face, we would not be afraid of drafts. Who ever thinks of contracting a cold because a wind strikes him in the face! Yet every part of the body can be made to resist cold just as well as the face. Low shoes in cold weather, thin soles, chilling of the ankles, and wet feet come in for a large share of the responsibility for colds.

Overwork and lack of sleep reduce the vitality in an astonishingly short time, and render one peculiarly susceptible to colds. Indulging too freely in a hearty dinner may be followed by a cold. Those who habitually have cold hands and feet easily take cold. Muffling the neck in winter is an injurious practise, for it causes relaxation of the skin. The garments about the throat are moistened by perspiration, the evaporation of which chills the skin, and a cold is often the sequence, frequently developing into the most aggravated and serious type. The free use of alcoholic beverages par-

alyzes the vasomotor mechanism of the skin, and renders one peculiarly susceptible to colds of various types.

Treatment.— *Preventive.*— The normal body automatically resists cold in any form; we voluntarily take shelter from cold, or otherwise instinctively attempt to protect the body from it. By preventive measures a more normal and healthful action of the reflex centers is produced, and these are ever on the alert to maintain an equilibrium of all the forces in the body.

Any measure that builds up the system and increases the vital resistance will increase the natural defenses of the body against cold in the same manner that any disease is successfully defeated. Sufficient refreshing sleep, wholesome food, and an active condition of the eliminative organs will insure against colds.

The most effective, inexpensive, and easily applied preventive agent against cold, and for maintaining the integrity of the skin, is the cold plunge, or the cold sponge or shower bath, taken upon rising in the morning. Of all tonics, medical or otherwise, this one is unexcelled and unequaled. It can be had without money and without price. Just as the morning shower rejuvenates and refreshes all nature, so the morning cold bath imparts new zest and joy to life.

No elaborate appliance or costly shower apparatus, not even a bath tub, is necessary in order that one may enjoy this luxury. A basin, a quart of cold water, and a rough towel will give perfect results. Those who systematically engage in this form of "cutaneous gymnastics" will not feel the necessity of burdening the body with extra layers of garments as cold weather comes on.

General.— A cold should be taken in hand at once, and summarily dealt with. It is no trivial matter, and therefore is not to be neglected. It is frequently the forerunner of tuberculosis, pneumonia, pleurisy, chronic catarrh, rheumatism, and other diseases.

When we speak of "breaking up a cold," we mean, physiologically, that the circulatory equilibrium of the blood must be re-established. A cold can not be "broken up" after twenty-four or thirty-six hours. It then runs a definite course; but its results may be mitigated by proper treatment.

The following measures, which may be adapted to the needs and surroundings of the patient, may be employed in the beginning of a cold to re-establish the disturbed circulation: (*a*) Go to bed, and remain there twenty-four hours; this is simple, but effectual. (*b*) Take vigorous exercise, as a long walk, a bicycle ride, a run, or stand in the fresh air, and take one hundred deep inspirations, rising on tiptoe each time. All such forms of exercise should be followed by a cold shower bath, or a cold sponge with vigorous friction. (*c*) If taken in time, a cold may be broken up by copious drinking of either hot or cold water. Several glasses should be taken in succession. This treatment is re-enforced by going to bed. (*d*) A very effectual way of dealing with a cold is to take a hot foot bath, apply fomentations to the spine, and a cold compress to the head and neck, continuing the treatment until free perspiration is induced. The patient must then be wrapped in a sheet and put to bed. This treatment may be made more effective by preceding it with a thorough hot enema. (*e*) The hot and cold spray with considerable pressure is also an excellent treatment. The cold wet-sheet pack continued to the point of perspiration, also the hot blanket pack, are favorite measures for combating an inflammation of the mucous membrane.

Local.— If the cold is in the head, the congestion may be relieved by applying cold compresses to the neck fifteen or twenty minutes at a time, with a cold compress on the head at the same time, or an ice-bag at the base of the brain. Dashes of cold water in the face give some relief. If the cold is in the throat, the cold compress just referred to may

be employed, alternating with fomentations once in two hours. A cold compress of cheese-cloth covered with flannel should be put on at night.

COUGH

When a cold "settles on the lungs," the most persistent symptom is a cough, which is often "tight," giving a feeling of constriction, or "tightening up." In such cases apply fomentation (see No. 170), with frequent changes, for an hour. Short treatments are not satisfactory. Inhaling vapor from boiling water is soothing, especially so if half a teaspoonful of the tincture of benzoin is added to a pint of boiling water.

Sometimes a cough is nothing more than a bad habit which, by a little care, might have been avoided at the start. There is sometimes an intense tickling in the throat, which is followed by a strong impulse to relieve it by coughing. Yielding to this inclination increases the irritation and calls for a repetition of the act, until the cough is firmly established.

If one must be about the next day, take a hot foot bath and follow with very thorough cold friction. Cold compresses, changed frequently, over the nose and eyes, also afford relief. Use, every one or two hours, a camphor-menthol inhaler, or a like solution in a nebulizer. Avoid violent blowing of the nose. It does no good, and it may involve the ears. Avoid overeating. "Stuffing a cold" only makes it more severe and prolongs its course.

CHRONIC NASAL CATARRH

Causes.— Repeated acute attacks, poor ventilation, lowered vitality, poor circulation, irritating gases or dust, lack of sunshine and fresh air, poor food.

There are two forms of acute nasal catarrh: —

1. *Hypertrophic Rhinitis.*—In this type the mucous mem-

brane is thickened, with marked obstruction, making nose breathing difficult. The secretions are thick and abundant, sneezing is common, dryness of the throat, mouth breathing, snoring at night, frontal headache, and impairment of hearing. In children habitual mouth breathing produces disturbances of functions, delays development, begets a peculiar, dull facial expression, and mental stupor, with marked deformity of the chest. The turbinated bones of the nasal cavity enlarge at times to such an extent as completely to obstruct one side. This condition may cause nosebleed, neuralgic pains, and a dull, aching pain between the eyes. This form of nasal catarrh may extend over a period of years, and as a rule little can be done for it in less than one year's time. A specialist in this line should be sought.

Treatment.— Catarrh is an indication of lowered vitality and an inactive skin. Any procedure that will increase the vital resistance and improve the general health will ameliorate any catarrhal condition. Attempt should be made to raise the general tone of the body. No catarrh can be cured without this. The body should be equably and properly clothed, and the diet should be nourishing and simple. The bowels should be carefully regulated, and the skin invigorated by the daily cold bath and friction.

2. *Ozena.*— This is the second form of chronic nasal catarrh. It is attended by a purulent discharge, having a foul odor, extremely offensive to the patient and even to friends. This form occurs most often in young adults. Most cases occur before the twenty-fifth year. In this disease the chambers of the nose are very much enlarged, the mucous membrane is pale and dry, and large scabs are present. The nose is usually broad.

Symptoms.— Exceedingly offensive breath, due to the decomposition of the excretions. The odor may permeate an entire room. There is a sense of dryness in the nose and throat.

Treatment.— Cleanliness of the nares is of the greatest importance. This may be maintained by the nasal douche. For this an ordinary fountain syringe may be used with a proper nasal tube. In using the syringe but little force should be employed, and the mouth must be kept open, while the patient leans a little forward. The fluid enters one nostril and returns by the other. Care must be exercised not to swallow the fluid. The douche may be repeated several times a day. The best results will be obtained by using the alternating warm and cold douches. Equal parts of sodium chloride (common salt), sodium borate, and sodium bicarbonate should be mixed, and a teaspoonful of the powder added to a pint of water. This is the best home treatment.

NOSEBLEED

Synonym.— Epistaxis.

Causes.— Injury, excessive heat, acute congestion of the head, measles, typhoid fever, diseases of the heart, lungs, and liver, diseases of the blood, nasal obstruction, due to a polypus or a foreign body, such as a button, bean, or pea, picking the nose, violent blowing of the nose, sneezing, vicarious menstruation, vasomotor disturbances. It occurs in boys and girls at the age of puberty. High altitude may cause it.

Treatment.— The majority of cases need no treatment, for the bleeding ususally stops spontaneously within ten or fifteen minutes. Hold the head erect, and apply ice or cold compresses to the neck or to the nose, or hot water at a temperature of 120°. In most cases the bleeding comes from a small point on the septum, and may be compressed with the fingers; or compress the facial artery by pressing the "corners" of the upper lip between the thumb and forefinger. A spray of ten grains of tannin in an ounce of water is sometimes effectual, or even the injection of ice-water. If the hemorrhage is quite severe, and if the blood

flows from the back part of the nose into the mouth, the posterior nares will have to be plugged. This may be done with absorbent cotton, cheese-cloth, or surgeons' lint.

ACUTE SORE THROAT

Synonyms.— Acute pharyngitis, simple angina.

Causes.— Same as in colds. Additional causes are overuse of the voice in poorly ventilated rooms, outdoor speaking, smoking, inhalation of poisonous gases. Sore throat may be present in many of the acute fevers, such as measles, German measles, scarlet fever, and diphtheria. Sore throat is common where there is a tendency to rheumatism.

Symptoms.— Irritation in the throat, with a pricking pain, and dryness, painful swallowing; if the inflammation is in the upper part of the throat, the pain radiates toward the ears; there may be more or less deafness. The temperature is frequently high. The constitutional symptoms are out of all proportion to the local inflammation. There is no hoarseness or cough. There is a tendency to hack and clear the throat. The mucous membrane of the throat is swollen, red, and covered with a thick, glazy mucus; frequently there are patches of diffuse red, with enlarged blood-vessels.

Treatment.— Same as colds. Locally apply cold compresses to the neck, changing frequently and alternating with fomentations once in two hours. At night apply the neck compress to the throat. (See Nos. 186, 170.) Hold bits of ice in the mouth early in the attack. A gargle of potassium chlorate, half a teaspoonful to half a glass of water, may be used frequently, or a gargle of listerine. As a rule, gargles do not reach the desired point. Camphor-menthol in a nebulizer and in an inhaler are especially helpful.

Sometimes the inflammation may be allayed by a demulcent drink, such as flaxseed tea, or an infusion of slippery-elm bark, or rice-water.

The diet should be light and fluid. Cocain should be avoided in all catarrhal inflammations.

CHRONIC PHARYNGITIS

Synonyms.— Chronic sore throat, granular sore throat, clergyman's sore throat, chronic follicular pharyngitis.

Causes.— A debilitated constitution, inactive skin, indigestion, constipation, breathing a vitiated atmosphere, frequent exposure to cold and damp, smoking, use of alcohol, dust, irritating gases, use of spices, condiments, greasy foods, nasal voice, and improper breathing or singing.

Symptoms.— The mucous membrane may be thickened, studded with swollen follicles two to ten in number, reddish in color, and often an enlarged vein seems to terminate in these little elevations, or blisters. In time the mucous membrane may become thin, and look pale, bloodless, and dry.

The first symptoms are feelings of congestion, dryness, or pricking sensations, at times sensations of a lump or hair in the throat, disposition to clear the throat, hacking, post-nasal catarrh, the voice easily tires, hardened pellets are expectorated in the morning, scabs form in the nose.

Treatment.— The causes of chronic catarrh must be removed as much as possible. Personal hygiene is important. Mouth breathing must be avoided, and correct breathing must be mastered. If there is constipation, the bowels must be regulated by adopting a proper diet. Fried foods, greasy foods, pork, fats, condiments, vinegar, alcohol, and tobacco are all irritating to the mucous surfaces, and therefore prolong catarrh.

The morning cold bath with friction is of the greatest importance in these cases. At night wear a cold compress on the throat well covered with oiled silk, rubber cloth, or oiled paper, and one thickness of flannel over this. An out-door life is important. A camphor-menthol inhaler is good. In severe cases it is well to consult a physician.

ACUTE LARYNGITIS

Acute laryngitis is an inflammation of the mucous membrane of the larynx.

Causes.— Taking cold, wet feet, drafts; exposure to cold and dampness; excessive use of the voice, speaking, singing, or shouting in poorly ventilated rooms or in the damp night air. Alcoholic stimulants, tobacco, defective excretion, and indoor occupations predispose to this disease.

Symptoms.— Comes on slowly. Dryness and tickling in the throat, some pain when breathing or talking or swallowing, coughing is marked, voice is hoarse or lost, breathing is labored, the temperature is 100° to 102°.

Treatment.— Hot enema, hot foot bath, rest in bed, cold compresses to the throat changed every five minutes if treatment is begun at once. After the first twelve hours, change compresses every fifteen minutes, and alternate with fomentations ten minutes every two hours. At night put on the heating neck compress, or a cold compress covered with flannel. Inhalation of steam and swallowing bits of ice are helpful measures. (See Nos. 195, 171, 186, 170.) Breathing cold, damp air should be avoided. Use the nebulizer or vaporizer frequently, with the following solution: —

℞	Camphor	½	dram
	Menthol	½	dram
	Oil eucalyptus	½	dram
	Oil cinnamon	20	minims
	Albolene	4	ounces

M.

Chronic laryngitis, tuberculous laryngitis, and syphilitic laryngitis need the personal attention of a specialist.

FALSE CROUP

Synonyms.— Spasmodic croup, laryngismus stridulus, spasmodic laryngitis, child crowing.

Causes. This is a purely nervous disease, in which there

is a temporary, complete, or incomplete closure of the glottis, preventing free inspiration. There is no inflammation of the larynx, but the attack frequently occurs during acute catarrhal inflammation of the larynx. Most cases occur between the ages of six months and three years. The disease occurs in common with rickets, and in poorly nourished or very fat babies. If a child is crossed, it may have passion fits, or hold the breath.

Symptoms.— Attacks come on suddenly at night. The child awakens in great fright, with temporary suspension of respiration, hence there is a struggle to get air; the face is first congested, then pallid, the eyeballs roll, the veins of the neck enlarge, the hands and feet may be contracted, convulsions may occur during the attack. In a few moments the child succeeds in getting a breath, when the inrush of air produces a peculiar crowing sound. One attack may follow another, or it may occur several nights in succession. Often the child will fall asleep immediately after the paroxysm is over, as if nothing had happened. Sweating about the head is common. There is no fever, no cough, no hoarseness. During the day the child appears perfectly normal. Death rarely occurs during an attack. Dr. Osler says, in speaking of the duration of this disease: "Too often the poor child, deluged with drugs, is longer in recovering from the treatment than he would be from the disease."

Treatment.— Nervous children subject to spasmodic croup should be gently dealt with, and given a simple, nourishing diet. The bowels should be carefully regulated, and the vital energy increased by the daily cold salt sponge bath. During the paroxysm, put a fomentation on the throat, or a warm flannel, heated by wrapping around a lamp chimney or holding on the stove top or door. Or if it is convenient, place the child in a full hot bath at 103°, and pour cold water on the chest. Or place in a wet sheet pack. (See Nos. 190, 170, 173, 185.) A quick way of stimulating the

respiration is to strike the chest with a cold wet towel. Tickling the child's throat with a feather or with the finger, causing vomiting, will relieve the spasm. This is especially called for if the child has eaten a hearty supper.

ACUTE BRONCHITIS

Bronchitis, or a cold on the chest, is an inflammation of the mucous membrane of the bronchial tubes of the lungs. It is very common, fatal only in the aged and in the very young, but often leads to serious complications. It is a disease that affects both lungs at once; and when the inflammation extends into the smaller tubes, it is called capillary bronchitis. This type is common in children and old people.

Causes.— Changeable weather, exposure, debility, rheumatism, acute fevers, typhoid fever, measles, malaria, whooping-cough, inhalation of irritating gases.

Symptoms.— It may extend from the nose, throat, or larynx. There is a feeling of tightness or constriction in the chest, pain in the back and beneath the breast-bone. The fever is mild. The cough is harsh, rough, and severe, producing great distress at the waist after the first or second day. After the first twenty-four or thirty-six hours there is a frothy expectoration, which changes in a few days to a thick, yellowish sputum. If the ear is put to the chest, distinct sounds are heard all over the lungs.

Treatment.— (See Colds.) In addition to the treatment suggested, the hot chest pack should be given for ten minutes, followed by the cold pack, which may be renewed once every hour, or, if the patient sleeps, at longer intervals. The wet sheet pack should be applied at night. (See Nos. 178, 185.) This treatment will usually relieve the cough.

If the cold is light, fomentations two or three times a day with the chest pack at night will be all that is necessary. The wet towel rub or the wet hand rub can be combined with this treatment to reduce the fever and to stimulate glandular

activity. During the disease, one should drink water or lemonade freely. If an attempt is made to break up a cold by a vigorous sweat, great care must be exercised to avoid taking more cold by chilling. It is safest to go to bed at once following any severe eliminative treatment. To sweat for several hours after such treatment is beneficial. A cold requires energetic treatment at the start.

In capillary bronchitis the disease runs a severe, rapid, and often fatal course. No delay in beginning treatment should be made. If in a young child, one of the best treatments is the warm pack, letting the child remain in it for an hour or more if it sleeps. Repeat three or four times a day. Keep cold compresses on the head. (See Nos. 175, 186.) Alternating with this treatment, apply fomentations for a few minutes, followed by frequent cold compresses wrung out of water at 75°. At night put on the chest pack. Move the bowels daily with the enema. Be sure that the feet are kept warm. This is a point that must always be observed in the treatment of either acute or chronic diseases. The diet should be light and unstimulating.

COUGH

This is not a disease, but a symptom. However, as it may be due to disease in a number of different organs, we shall consider the cause and treatment together. A cough is always a reflex act, and is an effort on the part of nature to benefit and protect the body.

After a particle of dust has been removed from the eye, the irritation remains, as does also the feeling that there is still something there. This in a way illustrates the cough. A cough is always due to irritation, and may continue after the source of irritation has been removed. A cough becomes injurious after there is nothing to cough up, or when nothing can be coughed up.

CAUSES.— 1. The most frequent cause of cough is irrita-

tion of the pharynx and bronchial tubes, due to catarrh, mucus, and irritating particles of dust. If the expiratory nerves are irritated, the cough is loud, violent, and prolonged. If the inspiratory nerves are irritated, the cough is short and hacking. When the pharynx and esophagus are irritated, the coughing is violent, and may even cause vomiting. This is especially so in infants and children.

2. Irritation of the larynx and trachea.

3. Irritation in the lung itself. This is indicated by very rapid respirations and rapid expiratory effort. A cough due to irritation of the lung itself or due to pressure upon the lung is usually relieved by the sitting or half-sitting position, as in pneumonia, pleurisy, tuberculosis, bronchitis.

4. Cough is produced by irritation of the pleura, as in pleurisy.

5. Cough is caused by indigestion and irritation of the gastric nerves, giving rise to the so-called "stomach cough." In this case, as in others, the irritation acts reflexly upon the respiratory nerves. This cough usually comes on after eating or late in the day, and is very violent. Distention of the stomach and colon, pressing upon the diaphragm, will sometimes cause cough.

6. Cough may be caused by a long soft palate.

7. Diseases of the ear sometimes produce the "ear cough."

8. Cough is produced by diseases of the liver and spleen.

Treatment.— Effort must be put forth to ascertain the cause of the cough, and remove it if possible. Cough in the pharynx or larynx can be relieved by sprays of alkaline solutions, followed by menthol and camphor used in an inhaler, nebulizer, or vaporizer. In such cases the cold neck compress is excellent. (See No. 186.)

If the cough is due to existing conditions in the chest, drink freely of water to dilute the blood, and thus render the secretions more fluid. At times an irritating cough may be checked by simply sipping a cup of very hot water. Fomen-

tations between the shoulders are good. (See No. 170.) The best and most effectual treatment is the hot and cold chest pack (see No. 178), followed by the heating pack, which may be renewed frequently during the day, and left on all night. At times a dry cotton pack to the chest will relieve the coughing. See page 335.

A chest cough will be benefited by inhaling the vapor of steam or medicated steam. Put a teaspoonful of the compound tincture of benzoin in a pint of water at 150°, and inhale the vapor. Nearly any one can improvise a suitable inhaler. To get water at 150°, mix two parts of boiling water with one part cold water, at about 60°. The oil of Scotch pine or oil of tar can be used in the same manner. Both of these have a tendency to check secretions and allay irritation, while the tincture of benzoin has a sedative effect.

Expectorants and opium should be avoided as much as possible in the treatment of cough. Alkalies increase the secretions of the lungs, and acids check secretions.

"Stomach cough" will be relieved by taking half a teaspoonful of bicarbonate of soda (baking-soda) in half a glass of water, and sipping slowly. The diet should be regulated, and appropriate treatment taken. (See Diseases of the Stomach, pages 305-316.)

A slight hacking cough, or a cough occurring in the morning before rising, should be regarded with apprehension, and attended to at once; it may be the beginning of tuberculosis.

PLEURISY

This is an inflammation of the pleural membranes that surround the lungs.

In pleurisy there is at first a congestion of the pleura, and dryness of the surfaces. This constitutes the first stage, and is accompanied by intense pain, due to the rubbing together of the two dry pleural surfaces. In the course of a few hours to a day or more there is a marked transfusion of

inflammatory lymph, and an effusion of serum into the pleural cavity, which presses upon the lung and separates it from the chest wall. The fluid may cover the entire lung. In the majority of cases, this fluid is absorbed in from one to two weeks. If it is not absorbed, it may become infected with pus germs and result in a large pus cavity. The fluid may vary in quantity from one to eight pints.

Causes.— Medical statistics show that in ninety per cent of cases, pleurisy is due to tuberculosis. Exposure and rheumatism are common causes. It occurs most often in the winter and spring. It may be secondary to typhoid fever, influenza, Bright's disease, or pneumonia.

Symptoms.— *Dry Stage.*— A sharp pain near the nipple or in the side, increased by breathing; respiration rapid and jerky. Pain is most severe on inspiration. At times the pain may be most marked in the abdominal cavity, and be mistaken for some stomach or bowel trouble. The cough is short, dry, and painful. There is but little sputum. Patient lies upon the sound side. Pulse is rapid; the temperature gradually rises to 102° or 103°. The severe pain is due to the dry pleura rubbing together. The friction can be felt and heard.

Stage of Effusion.— In this stage a large amount of fluid collects between the pleura. Pain is diminished, breathing is more labored, and if the effusion is on the left side, the heart is pushed to the right. The fever continues. The white blood-cells are increased in number. There is a rapid loss of flesh and strength. The urine is scant and highly colored. The chest may bulge somewhat on the affected side. The duration of this stage is about one week.

Stage of Decline.— During this stage all the symptoms become less severe, and the patient slowly approaches the normal state. The effusion in most cases is slowly absorbed. At times suppuration may take place. During this stage adhesions may form between the pleural surfaces, or the lung

may be retracted. The physical signs of pleurisy are omitted, for it requires special skill to recognize and interpret these signs.

At times it is difficult to distinguish between pleurisy and pneumonia, and often only a thoroughly well-informed physician is able to do this. The mortality in pleurisy is from two to twenty-five per cent.

Treatment.— The treatment of pleurisy is very much like that for pneumonia. Rest in bed, thorough cleansing, daily enema. If the fever is high, the cool enema, 80°, may be given every few hours, and retained for ten or fifteen minutes. This has a powerful influence upon the fever. Locally apply fomentations and cold compresses to the affected side, changing the latter every fifteen to twenty minutes, and alternate with fomentations every two or three hours. (See Nos. 170, 186.) It frequently occurs in pleurisy that cold to the side is not agreeable to the patient, but heat affords great relief. In this case omit the compresses. If the pain in the side is very severe, or if the cough is marked, the patient can be made more comfortable by having a bandage eight or ten inches wide of cotton gauze or cheese-cloth placed around the chest, and pinned tight while the patient breathes out. This will reduce the motion of the side. Reduce the fever with the wet sheet pack or the wet towel rub. (See Nos. 185, 184.) Apply the ice-bag over the heart fifteen minutes every four hours, and give cold friction three times a day. (See No. 199.) After the fever begins to abate, give hot and cold applications to the affected side for fifteen minutes three times a day. (See No. 189.) Have the patient drink often and freely. The diet should be light, consisting of gluten, oatmeal, or barley gruel, toast, soft eggs, egg-nog, baked apples, oranges, or unsugared fruit juices. If the effusion does not absorb quickly, or if it is very extensive, it will have to be drawn off. Avoid all salt in the food.

HEMORRHAGE OF THE LUNGS

CAUSES.— The expectoration of blood is more likely to be due to a hemorrhage from a bronchial blood-vessel or from the erosion of a blood-vessel due to tuberculosis, than from any other cause. Hemorrhage from the lungs is frequently the first warning to the patient of incipient tuberculosis. However, the hemorrhage may be due to heart-disease, vicarious menstruation, rupture of an aneurism, or to some blood disease.

SYMPTOMS.— As a rule, there is no premonition. The blood is raised by a cough, and is warm and salty in the mouth. Generally the hemorrhage is not profuse, but by frequent hemorrhages a patient may lose considerable blood. Even a small loss is attended by great physical weakness.

Remember that blood from the lung in a hemorrhage is always bright red, frothy, and mixed with air and mucus, and is alkaline. Vomited blood is dark, clotted, mixed with food, and is acid. Blood may come from the nose or throat, be swallowed, and then vomited. Blood in slight hemorrhages may come from congested tonsils in the upper part of the pharynx.

TREATMENT.— Put to rest in bed in the half-sitting position, placing the back of a chair or large pillows behind the patient. Absolute rest must be enjoined, even to not talking. This is necessary for three or four days.

Place large cold compresses, 60°, wrung dry, over the entire chest of the patient, and cover with a flannel. Change every ten minutes for several hours. Repeat for two or three days. (See No. 186.) Slip a spine bag down between the shoulders for fifteen minutes every two or three hours. Place hot-water bags or hot-water bottles to the feet and legs. Let the patient hold pieces of ice in the mouth, and swallow small bits of ice. Use the following solution in a nebulizer, inhaling every two hours for ten minutes, but avoiding deep

breathing: Albolene, four ounces; turpentine, three drams. If possible, such patients should seek a higher altitude.

BRONCHO-PNEUMONIA

Synonyms.— Capillary bronchitis, lobular pneumonia, catarrhal pneumonia.

This is an inflammation of the terminal bronchial tubes, and of the air-cells that make up the lobules of the lung. The disease usually begins as bronchitis.

Causes.— Follows smallpox, measles, scarlet fever, diphtheria, influenza, whooping-cough. It is always a serious complication. The disease is common in children, and in the aged. It is most frequent during the cold and wet months.

This disease differs from lobar pneumonia in that both lungs are involved, and only parts of the lungs are consolidated instead of an entire lobe.

Symptoms.— These may be covered up by the previous disease. The onset is gradual. In very young infants the symptoms are fever, prostration, rapid pulse, difficult breathing. Ordinarily the temperature is irregular, varying from 100° to 105°. The skin is dry. The cough is hard and painful. The breathing is jerky, grunting, and very labored. Respirations vary from fifty to eighty a minute. The pulse is from one hundred forty to one hundred seventy a minute. The child has an anxious expression, and may show signs of suffocation. At times the child is restless, has convulsions, or is delirious. There is little if any sputum. Vomiting may occur. Duration from one to three weeks. The death-rate is very high.

Treatment.— There is an old maxim, "Never despair of a sick child." None are so sick but they may recover. The disease may often be prevented if bronchitis is properly cared for in its early stage. Rest in bed, good ventilation, temperature of room from 65° to 68°, no drafts, moist

atmosphere (by steam), liquid diet, milk, gruels, strained white of egg, fruit juices if child is old enough. Open the bowels at the onset with castor-oil or a thorough enema at 102°, and secure a daily movement.

Give fomentations to the chest for five minutes; follow by cold compress wrung out of water at 75°, and changed once in twenty minutes, or put on as a chest pack, and changed every hour. (See Nos. 170, 186, 178.) The application of cold compresses to the head, and bathing the face with cold water, will relieve the nervous symptoms. The full neutral bath at 95° for fifteen minutes is excellent as a final treatment at night. (See Nos. 186, 174.) The full warm pack will often cause the child to go to sleep in it. If so, leave in an hour or more. Watch the feet carefully, and see that they are never cold. Cold feet are always exceedingly depressing to a sick child. If the child gets blue in the face at any time during the sickness, give a full hot bath at 104° for ten minutes, or a hot blanket pack, and follow with cool friction, drying well. If the heart is very rapid, apply cold compresses three or four times a day fifteen minutes at a time. Never give brandy or whisky to a sick child. Avoid all cough sirups. They are dangerous. If more than five years old, give the wet sheet pack wrung out of water at 80° for an hour, if the child sleeps. (See Nos. 173, 175, 185.)

ASTHMA

Synonyms.— Nervous asthma, spasmodic asthma, bronchial asthma.

Causes.— Asthma is a purely nervous affection, occurring frequently in individuals who have distention of the air-cells, due to some great pressure in expiratory effort. Bronchitis is the most common cause. Peculiar odors, gases, and vapors, or the liberated pollen of certain plants and flowers, may be the exciting cause.

No doubt this disease is due to nervous influences causing

a spasm of the bronchial muscles. In some cases it is due to congestion of the mucous membrane of the bronchial tubes.

Symptoms.— The onset is sudden. Sometimes peculiar sensations, such as chilly feelings, tightness in the chest, or the passage of large quantities of urine, precede an attack. Night attacks are very common. There is a feeling of suffocation and oppression, so that the patient gasps for air, or runs to a window, or sits upright and struggles to obtain air. The face is congested, the veins of the neck are large, the eyes are bulging, speech is impossible. The attack may last from a few minutes to several hours. The breathing is labored and wheezing. Sounds can be heard all over the lungs. After the attack the patient often coughs a sputum which contains little grayish balls; these are spirals of mucus, and are called Curschmann's spirals.

Cardiac and renal asthma are due to organic diseases of these organs.

Asthma, without complications, seldom proves fatal.

Treatment.— *During the Attack.*— Apply large fomentations to the chest and spine, and continue until relieved. Avoid cold treatment. (See Nos. 170, 178.) Some asthmatic attacks are of short duration and pass away before any treatment can be given.

Between Attacks.— During the intervals every effort must be made to build up the general health of the patient. Improve the appetite as much as possible. Graduated outdoor exercise, hot and cold to the spine, fomentations to the chest, cold friction, and the cold wet towel rub, increase the tone of the skin and the vital organs. Avoid late suppers, excitement, and emotion. The air of the room in which the patient sleeps should not be unduly dry.

Asthma can not be cured by inhaling the fumes or smoking cigarettes of the numerous preparations advertised in the newspapers and by quack doctors. A dry climate with a medium altitude is the best place for the asthmatic.

HAY-FEVER

Synonyms.— Hay-asthma, rose-cold, June-cold, autumnal catarrh, periodic rhinitis.

This is a disease of the upper air-passages, characterized by irritability of the mucous membrane, with asthmatic symptoms; sudden onset, recurring annually at a fixed time, ceasing when the patient reaches a certain locality, or when frost appears. Bostock first described this disease in 1819.

Causes.— Hereditary tendencies and a nervous temperament are predisposing causes. The most important exciting causes are, the pollen of various plants, odors of flowers, emanations from animals, dust, smoke, drugs, glare of the sun, intense heat, local nasal troubles.

Hay fever occurs at all ages, but usually before middle life. City dwellers are more subject to it than are those who live in the country. It is most common in the United States and England. The high seas afford complete immunity. Hay-fever symptoms have been brought on in a neurotic patient by looking at a painting of a full-blown rose or smelling of an artificial flower.

Symptoms.— Attacks occur on a definite day year after year, regardless of temperature, conditions, or surroundings. Itching and stinging sensations of the mucous membrane of the nose, palate, and conjunctiva, violent sneezing, a profuse flow of tears, neuralgic pains in the eyeball, headache, aching of the muscles, often great weakness, loss of appetite, sleeplessness. In the course of two weeks asthmatic attacks may come on, due to the swelling of the mucous membrane of the nose. The duration is usually about six weeks.

Treatment.— Great relief during an attack may be obtained by a sojourn in Northern Michigan, near the seashore, or in the mountains, or by a sea voyage. Bathing the eyes in very hot and cold water will give relief. Hot and cold compresses to the eyes and over the nose will relieve the

irritation. Or the eyes may be bathed with a solution of ten grains of biborate of sodium (borax) in an ounce of camphor water. Zinc oxid ointment applied to the lips and nostrils will relieve the irritation. If the eyes are very sore, smoked glasses should be worn, and it may be necessary to use an eye-wash every two hours.

If the eyes are badly inflamed it will be best to consult a specialist. However, no one thing is so effective in relieving eye irritation as the persistent use of hot and cold water alternately, or of either hot or cold water separately. The patient after a few treatments can determine which temperature gives the most relief.

The daily cold bath with friction will relieve the congested surface and stimulate the circulation. Cold compresses to the neck, with the hot foot bath, will enable the patient to sleep. The nebulizer and inhaler may both be used with benefit.

During the intervals every effort should be put forth to increase the vital resistance, and to improve the general health, by proper food, baths, exercise, rest, and sleep.

GOITER

Synonyms.— Bronchocele, struma.

This is an enlargement of the thyroid gland in the neck just below "Adam's apple."

The gland sometimes enlarges, due to congestion, as its blood supply is very large. It sometimes increases in size at puberty in girls, and during menstruation and pregnancy. Sexual excitement may cause a congestion of the gland.

Causes.— Sometimes it occurs in epidemics. Isolated cases are found in every locality. It is common in Michigan, New York, Washington, Switzerland, and in mountainous districts. The appearance of the disease is frequently associated with drinking water. Heredity has some influence.

Symptoms.— A gradual enlargement of the gland. If the gland is very large, it presses upon the larynx, restricting

the breathing and causing some cough. Pressure upon the vein of the neck may cause headache and drowsiness.

Treatment.— No special treatment is needed if the growth is slow. Relatively speaking, the thyroid gland has a blood supply eight times greater than the brain, hence it can easily and quickly be influenced by hydriatic measures. Hot and cold compresses applied over the goiter will stimulate the arterial circulation, and hasten absorption of abnormal deposits and the growth. The vital resistance of the body should be increased by tonic treatment, such as the cold sponge bath on rising in the morning, the wet towel rub, cold friction, the wet sheet pack, hot and cold to the spine, salt glow, the saline sponge bath, fomentations to the stomach and liver. Massage has given excellent results in reducing the size of a goiter.

Even if treatment seems to be a failure do not be discouraged, for as a matter of fact in the majority of cases the goiter gradually disappears. This is especially the case when children have goiter. I have seen five and six children in a family have goiter, and in a year or two it has all disappeared. A goiter that develops during pregnancy, and increases in size during the later months, should be regarded with some apprehension, and the patient should be especially watched during labor.

EXOPHTHALMIC GOITER

Synonyms.— Graves's disease, Basedow's disease.

The disease follows a perverted function of the thyroid gland.

Causes.— Most common in women between the ages of fifteen and thirty. It may follow fright, profound shock, overfatigue, or any great mental or physical exertion. The definite cause is unknown.

Symptoms.— Protrusion of the eyeball, enlarged thyroid gland, palpitation of the heart, tremor of the muscles, irri-

tability, mental depression, breathlessness, weakness, sweating, anemia, sleeplessness.

The eyes make the patient appear as if staring, and in time he is unable to close the eyelids, and a little of the white of the eye appears. Spasms of the eyelids may also occur. The upper eyelid does not follow the lower, but lags behind.

The pulse is very rapid, varying from one hundred to one hundred sixty beats a minute, and is increased by any excitement. The course of the disease is chronic. In some cases it disappears in six months to a year.

Treatment.— In advanced cases absolute rest in bed. At the beginning, properly graduated exercises, such as walking, Swedish movements, and massage. The diet should consist of fruits, well-cooked grains, toasted breads and nuts, eggs, milk, and fresh vegetables.

The palpitation of the heart is best controlled by placing an ice-bag or ice compress over the heart for twenty to thirty minutes three or four times a day, with cold compresses over the neck. Give the wet towel rub and cold friction while cold is applied over the heart. This will act as a tonic to the relaxed skin and blood-vessels, at the same time relieving the nervous condition of the patient. As the patient's strength permits, use other measures, such as the cool shower bath with friction, the wet sheet pack, fomentations to the spine, and hot foot baths. For sleeplessness apply the cold compress or the ice-bag over the heart, with the ice compress to the neck and a hot bag or hot bottles to the feet. (See Nos. 199, 186, 184, 185, 170, 171, 198.)

Massage applied every day will reduce the size of the goiter. Negative galvanism will also aid in the absorption of the deposit of abnormal tissue. Removal of the gland by surgical measures may be indicated, though it is well known by surgeons that their patients often die from thyroid poisoning.



CHAPTER XXV

Diseases of the Circulatory System

There are few diseases of the heart that can be benefited to any extent by home treatment. In the great majority of cases any organic disease of the heart is discovered by a physician, and then during a general examination, and not because the patient thought he had heart-disease. Usually where people imagine that they have some heart-disease because of pain and difficult breathing, the disturbing factor is due to intercostal neuralgia, or muscular rheumatism of the intercostal muscles on the left side.

ORGANIC HEART-DISEASE

The valves of the heart are defective, and the heart is enlarged.

Causes.— Prolonged strain, over-muscular strain; more than one half of the cases of organic heart-disease are due to acute or inflammatory rheumatism. Diphtheria, scarlet fever, pneumonia, influenza, chorea, typhoid fever, and smallpox may cause chronic heart-disease. It is due to gout, alcohol, tobacco, syphilis, heredity, and acute intoxication. It may occur at any age. Disease of the mitral valves is the most common.

Symptoms.— There are few if any symptoms while the

heart is in good compensation. By this is meant that when a valve of the heart is defective, the heart muscle develops to an extent that enables it to do the normal work in spite of the defect. This is a wonderful provision. When compensation begins to fail, the symptoms appear, such as palpitation, swelling of the feet, which gradually increases, difficult breathing on slight exertion, cough, congestion of the head and headache, starting up suddenly from a sound sleep, insomnia, marked throbbing of the heart, weak and irregular pulse. The stomach, liver, and kidneys may all be involved. Death may be sudden. With carefulness one may have organic heart-disease for a score of years, and in fact die from some other cause.

Treatment.— Avoid hurry, straining, violent work or exercise, worry, alcohol, tobacco, and meat, and live a moderate life. Exercise daily in general work or take long walks, according to strength. Bathe daily, or take a cold friction or plunge every morning. (See No. 184.) Avoid hot baths or hot trunk or blanket packs. In any hot treatment about the chest have an ice-bag or cold compress over the heart. (See Nos. 199, 186.)

When swelling of the feet begins, the patient should have the ice-bag over the heart fifteen minutes and cold friction three times a day, and avoid being on the feet too constantly. Hot and cold to the spine and wet sheet packs daily are tonic measures. (See Nos. 189, 185.) Swelling of the feet indicates a weakening of the heart muscle and the beginning of dropsy. When the swelling becomes marked, the patient should remain in bed, and keep as quiet as possible. The heart requires rest. All freedom from exertion enables the heart muscle to do its work better by removing the load. With proper rest and treatment, the heart muscle will usually recover sufficient strength to pump the blood with force enough to keep all the serum in the blood. The dropsy will disappear.

At any time when walking or working, if the heart begins to beat violently, he should sit down, or, better still, lie down for a short time, and allow the heart to recover itself. When breathing is difficult the patient should be propped up with pillows or a chair at the back, and do as little talking as possible. Brief fomentations to the chest and spine, followed by a brisk cold friction, will give relief. When the patient is very feeble or advanced in years, care must be exercised not to use water too cold.

PALPITATION OF THE HEART

Causes.— Palpitation of the heart often occurs in boys and girls at puberty. Women at their menstrual period frequently suffer from palpitation. It occurs in hysteria and neurasthenia. It may be caused by fright or emotion. It frequently follows fevers.

The most common cause of palpitation of the heart is the use of tea, coffee, alcohol, and cigarettes. These poisons derange the nervous system and the stomach, and interfere with the delicate mechanism controlling the heart's action. Palpitation of the heart may be due to indigestion or the presence of gas in the stomach. It occurs in pregnancy, probably due to reflex irritation. It is present in exophthalmic goiter, and it may result from excessive sexual indulgence.

Symptoms.— Comes on with great suddenness; the heart flutters or beats one hundred fifty to one hundred sixty times a minute. This gives rise to much anxiety. There is a feeling of oppression. The face may be pallid at the onset and then become flushed. The attack lasts from a few minutes to several hours, and is followed by a feeling of exhaustion.

Treatment.— The first condition is to remove the exciting cause if possible. During an attack to rest in a semi-reclining position is of the first importance. Give a hot foot pack, and place an ice-bag, cracked ice in a towel, or a cold

compress, over the heart for fifteen to twenty minutes. (See Nos. 176, 199, 186.) Swallowing bits of ice or sipping ice-water will aid this treatment. It is well to bear in mind that in palpitation of the heart, the heart will not stop beating, even though the patient faints.

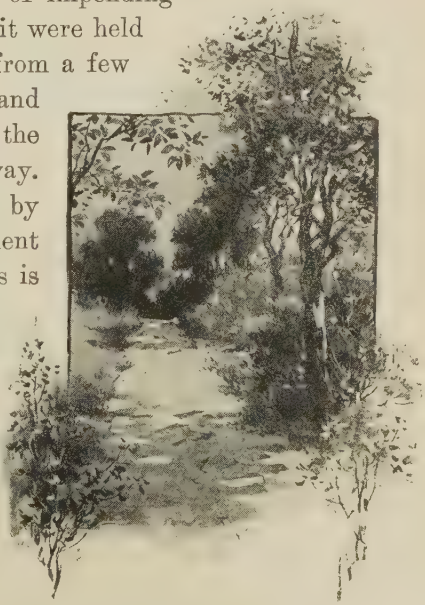
During the intervals the general health should be built up. Tea, coffee, alcohol, and tobacco should be discarded.

ANGINA PECTORIS

SYNONYMS.— Breast-pang, neuralgia of the heart.

CAUSES.— Most common in men over fifty years old. Alcohol and tobacco predispose to the disease. The exact cause is not definitely known. A hardening of the coronary arteries which supply the heart with blood, is no doubt one cause. It may be due to neuralgia of the heart muscle. It is usually associated with organic heart-disease.

SYMPTOMS.— A sudden pain seizes the patient in the region of the heart, of a burning, stabbing, lancinating nature, and radiates to the left shoulder, down the arm to the little finger. There is a sensation of impending death. The heart feels as if it were held in a vise. The attack lasts from a few seconds to several minutes, and one may drop dead during the attack, or he may faint away. The attack may be followed by numbness, vomiting, movement of the bowels. The prognosis is very unfavorable, as the patient may drop dead at any time.



TREATMENT.— Lead a quiet life, and avoid all excitement. Avoid all great exertions. Adopt a

simple diet. All stimulants are dangerous. During an attack, have the patient lie down, and apply hot fomentations over the heart for a few minutes, or an ice-bag. (See Nos. 170, 199.) Do not be afraid to do this. As angina pectoris is almost invariably associated with organic heart disease, the general care and treatment of the patient should be the same as that given on page 357. What is encouraging is that these attacks do not occur very frequently as compared with the number of cases of heart disease. One of these attacks should be sufficient warning to any one to "set his house in order."

VARICOSE VEINS

This is a dilatation of the veins, and is more common in women than in men. It occurs most frequently in the veins of the leg, usually the superficial veins. In men varicose veins are frequent in the spermatic cord.

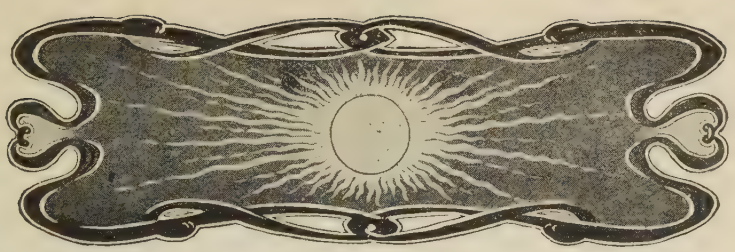
Causes.— Pregnancy, tumors, local obstruction, weak heart with sluggish circulation, long standing upon the feet, straining, and excessive exertion.

Symptoms.— Thickened, tortuous, knotted veins may be felt and seen beneath the skin. There is usually a dull aching pain. Ulcers may result.

Treatment.— If due to pregnancy, but little trouble will be experienced after confinement. Obstructions should be removed if possible. The bowels should be carefully regulated. Strengthen the heart by hot and cold applications, and cold friction to the skin. Avoid all strain, or remaining in the erect position long at a time. Take a teaspoonful of Basham's mixture four or five times a day.

Wear an elastic stocking or put on an elastic bandage. This affords very great relief, as it furnishes evenly distributed support and pressure. In time it loses its effect.

Very large varicose veins may require surgical attention before permanent relief can be obtained.



CHAPTER XXVI

Diseases of the Kidneys

FLOATING KIDNEY

This condition is variable. When only the lower end can be felt, it is said to be palpable. If it moves down sufficiently on taking a deep breath so that the fingers can be slipped above it, it is called a movable kidney. A floating kidney is one that moves readily in the abdominal cavity. It is most common in the right side, and occurs most frequently in women, due to tight dressing, and hanging heavy skirts about the waist. It is frequently associated with a prolapsed stomach or a prolapsed bowel, or it may be due to strain and heavy lifting.

Symptoms.— May not cause any discomfort; the patient may be unconscious of its existence; or there may be severe dragging sensations, with a feeling of weight. In some cases there is nausea, vomiting, and intestinal pain with radiating pains.

Treatment.— This trouble can be permanently remedied only by a surgical operation. Remove all tight bands, avoid corsets, and suspend the garments from the shoulders.

SUPPRESSION OF URINE

This indicates that the kidneys are not eliminating the waste products from the blood; it may be partial or com-

plete. It may be due to acute inflammation of the kidneys, fevers, acute poisoning from turpentine, or to a stone in the kidney at its duct, or to an injury.

Treatment.— Usually surgical interference is the only hope. Thorough high enemas, 115°, sweating, and fomentations over the region of the kidney, will give some relief, together with hot packs repeated every three or four hours. (See Nos. 195, 170, 175.) In giving the hot enema, use a bowel tube; pass up twelve or fifteen inches, having the fountain syringe only six or eight inches above the patient's hips. Allow the water to pass slowly for several hours.

RETENTION OF URINE

In this case the urine collects in the bladder, but can not be passed. It may be due to purely nervous influences, to pregnancy, because of pressure, and following labor, because of the great pressure upon the urethra by the head of the child; or it may be due to a stone, or a growth in the bladder. In men it is frequently due to enlargement of the prostate gland at the neck of the bladder, or to an acute inflammation of the bladder. It sometimes occurs in the new-born for the first twenty-four hours or more.

Symptoms.— Feeling of fulness in the bladder, desire to urinate, progressive, increasing, intense pain, which finally becomes very severe and comes on in paroxysms. The patient suffers the most intense agony. The bladder gradually enlarges.

Treatment.— If due to nervous influences, or to inflammation, or when it occurs in the new-born, a hot sitz bath will relax the tissues, so urination is possible. (See No. 172.) Hot compresses applied over the genital organs will often be all that is necessary. (See No. 186.) If retention of urine is due to obstruction, a catheter will have to be passed; this should be done by a physician or a trained nurse, for any carelessness in this operation may result in lifelong

misery. Urine should be drawn once in six hours. (See How to Pass Catheter, page 229.)

BLOOD IN THE URINE

1. It may be due to acute fevers.
2. To acute inflammation of the kidneys or bladder.
3. To poisons, such as turpentine, carbolic acid, and Spanish fly.
4. To stone in the kidney or in the bladder.
5. To a blow over the kidney.
6. To a tumor of the kidney or bladder.
7. To menstruation.

BRIGHT'S DISEASE

Synonyms.—Nephritis (acute and chronic parenchymatous; chronic interstitial); acute and chronic inflammation.

Many persons have vague pains in the region of the back, and possibly near the kidney, and so it is taken for granted that they have kidney disease. Such persons become the ready prey of the quack, and of the patent-medicine vender who has a "sure cure." As a matter of fact, pain in the back or between the kidneys is no indication of kidney disease. It is very rarely that disease of these organs produces pain at all.

Acute.— Causes.— This is a common complication of scarlet fever, diphtheria, typhoid fever, pneumonia, smallpox, and influenza. Exposure to cold is a very common cause. It may be due to drug-poisoning, as turpentine or carbolic acid, or to alcoholism. It may occur during or following pregnancy.

In this disease marked structural changes occur in the substance of the kidney, so that it only partially performs its allotted work. The little cells that eliminate the waste products from the blood are swollen, destroyed, and finally appear in the urine as casts.

Symptoms.— Mild cases are likely to be overlooked. In severe cases the onset is sudden, with appearance of dropsy in a day or two. The face is swollen; the ankles are enlarged and pit on pressure. Children may have convulsions. The urine is scanty, highly colored, has high specific gravity, and contains blood, albumen, and casts. A chemical and microscopic examination of the urine is necessary. If the urine is boiled, thirty per cent in bulk of albumen may be found. The blood is usually impoverished.

In scarlet fever and diphtheria, acute inflammation of the kidney should always be expected, and the patient treated accordingly.

In some cases nausea, vomiting, loss of appetite, headache, stupor, fever, sleeplessness, restlessness, and muscular twitchings may be present. In such cases the mortality is high.

Treatment.— Rest in bed is imperative. The diet should be light and unstimulating. Meat and eggs should be avoided. Fresh fruit juices, and dextrinized, thoroughly toasted cereal foods are the best diet. A diet of skimmed milk is very acceptable if fruits free from sugar can not be obtained. Beef tea and meat broths should be carefully avoided, for these so-called foods are only solutions of poisons, and irritate the already inflamed kidney. Little salt should be used.

In acute Bright's disease the indication is to relieve the kidney by causing the skin and bowels to act more freely. In this way the kidneys are allowed to rest as much as possible,— an important measure in any inflammation.

Cleanse the bowels daily with a large hot enema, 110°, or give a tablespoonful of salts; encourage free drinking of water and lemonade. The full hot bath, 102°, or the full neutral bath given at 95°, will encourage the elimination of poisons. If a full bath is not convenient, give hot foot baths and fomentations to the spine to encourage perspiration (see Nos. 195, 169, 173, 174, 171, 170); or give the patient daily a hot blanket pack. (See No. 175.) If the

patient sleeps, continue it for one hour. A return to a solid diet must be gradual. Aside from moderately cold friction, general cold treatment should be avoided.

Chronic.— There are two varieties of chronic inflammation of the kidney, but for the sake of brevity both will be considered together.

Causes.— Nearly one third of the acute cases of nephritis pass into the chronic state. It is more common in men, occurring most frequently between forty and sixty years of age. Bright's disease is increasing at an alarming rate. The excessive consumption of meat to-day is one important factor in causing the disease. Meat loads the system with uric acid and other poisons which act as direct irritants to the delicate structures of the kidney, producing organic changes. Bright's disease is common among those who engage too freely in the pleasures of the table. The blood is overcharged, and the kidneys are overwhelmed with work, and finally become crippled. A man with a defective kidney is much more to be pitied than he who has lost a leg or an arm. Alcohol is a prolific factor in causing Bright's disease. Exposure, worry, business cares, anxiety, overwork, hasty eating, lack of exercise, loss of sleep, neglect of the skin,— all have an important bearing upon the disease.

Symptoms.— In one type there is gradually failing health, dyspepsia, loss of appetite, loss of strength, dropsy of the ankle, puffiness of the eyelids and face; dropsy may become general, pulse is increased, the heart enlarged; symptoms of uremic poisoning appear, such as stupor, convulsions, unconsciousness, headache, sleeplessness; breath smells like the urine. The urine is diminished in quantity, has a smoky or turbid color, contains a large amount of albumen and many casts, with a high specific gravity.

In the other type the disease may have been present for years before it was discovered by an examination of the urine. At first there are no important symptoms. Patient

is troubled with insomnia, is nervous, and notices that he has to get up several times during the night to urinate. Headache is common, and neuralgia appears. There is a loss of appetite, dyspepsia, failing vision, labored breathing on slight exertion; the blood-vessels are hard, and at times feel knotted and firm like a pipe-stem; the heart is enlarged and may be irregular. Colds are easily contracted; breathing at times is very difficult. Vomiting may be common. Eczema, irritation of the skin, and sleeplessness are very common and troublesome symptoms. Dropsy is not common in this type. The muscles cramp; blindness may occur; there may be ringing in the ears.

Bright's disease is considered incurable. The duration may be from one to fifteen or twenty years.

Treatment.— One who is unfortunate enough to have this disease should go to a thoroughly equipped sanitarium, where the diet can be carefully regulated, and where scientific hydrotherapy is employed, and take a course of treatment. Do not be deceived with the hope that the disease can be cured by swallowing some secret remedy that is warranted to cure without fail. If there were such a remedy, the entire medical profession would hail it with delight.

So far as treatments are concerned, little can be done in the home. Diet is of the greatest importance. This should consist of selected fruits, grains in the form of toasted preparations, nut foods, and vegetables. The use of meats, alcohol, tea, coffee, and tobacco, will prevent any progress being made by rational treatment. Patients should be free from all business worry, lead an active outdoor life, making it a point to be in the sunshine as much as possible. A dry, sunny climate with a high altitude is the best. General cold baths should be avoided. The skin should be kept in an active condition by taking hot blanket packs, dry packs, or cabinet baths to the point of free perspiration, once or twice a week, followed with cold friction. Such treatments are

best if taken at bedtime. Attention should be given to proper clothing, for such patients as a rule need to be warmly clad. Woolen garments are best. A moderately cold friction in the morning on rising will be highly beneficial. (See Nos. 175, 197, 184.)

The prolonged neutral bath at 98° to 95° is of the greatest importance in Bright's disease. It is preferably taken at night, so as to induce sleep and relieve the skin irritation. (See No. 174.) Massage, electricity, and manual movements are all useful in the treatment of this disease.

RENAL CALCULUS

This is the formation of a stone or concretions in the kidney, with the passage of calculi through the urinary tract.

Causes.— Occurs in early adult and later periods of life. Most commen in men. Increased acidity of the urine, which may be caused by excessive meat eating, according to Halliburton, is an important cause. Prolonged muscular exercise, an inactive liver, and poor digestion, are also causative factors. Excessive eating and drinking, and mental worry, are not to be overlooked. Sedentary life, rheumatism, excess of uric acid, lack of water drinking, inflammation of the kidney, an excessive nitrogenous diet, and alcoholism are common causes.

Symptoms.— The symptoms that indicate stones in the kidney are caused by the passage of the stone through the ureter to the bladder. This is called renal colic. Pain is severe, sudden, paroxysmal, radiating into the bladder, and in the male into the testicle of the same side, or the pain may be reflected in the groin and thigh. The testicle is retracted because of irritation of the cremasteric muscle. The patient may be faint, have convulsions, vomit, sweat, and after the attack pass a large quantity of urine, which is usually bloody. The duration of the attack varies from a

few hours to several days, in which case the paroxysms are intermittent. If the stone lodges in the ureter, it may cause complete suppression of the urine, which, if unrelieved, will cause death in the course of a few days.

A stone may form in the pelvis of the kidney and remain there for years. The author has seen several larger than a walnut.

Treatment.—The diet should be given careful attention. The patient must avoid meat, alcohol, beef teas, and stimulants. Eat little, and drink copiously of pure water. Fresh fruits are beneficial. He should take outdoor exercise to the point of healthy fatigue, avoiding a sedentary life. During the attack relieve the pain by very hot fomentations over the abdomen and small of the back, or give the hot trunk pack; or a hot sitz bath may be taken. (See Nos. 170, 175, 172.) As in the treatment of gall-stones, large hot applications must be persisted in vigorously, and continued for several hours if necessary.

The large enema given at a temperature of 115° with the hips elevated may relax the ureters, favor passage of the stones, and soothe the patient.

A stone in the kidney can be removed only by a surgical operation.



CHAPTER XXVII

Diseases of the Blood

ANEMIA

This is a condition in which the blood as a whole may be reduced in amount; or one or more of its constituents, such as the red blood-corpuscles, the white blood-corpuscles, or the coloring matter, the hemoglobin, may be altered in quantity and quality.

There are two definite forms of anemia. One is called primary, or essential anemia, under which we have chlorosis, or green-sickness. The second form is known as progressive pernicious anemia. Under this we have secondary anemia.

CHLOROSIS

Synonyms.— Green-sickness, chloremia.

Causes.— It occurs almost exclusively in young girls about the time of puberty, at times a little later. It is infrequent after seventeen. It is more common in the cities. Heredity has some influence. It is most common in girls who are poorly fed, overworked, and who live in poorly ventilated and badly lighted rooms. The active underlying cause has yet to be discovered.

Symptoms.— Anemia, with great reduction of the coloring matter of the blood and some reduction of the number

of red blood-corpuscles. This can be determined only by a microscopical examination. Dyspepsia is common, attended by a perverted and capricious appetite for acids, pickles, plaster, chalk, pencils, and other articles. The complexion has a yellowish green tint. The patient as a rule appears to be well fed, and the cheeks redden on exertion. The eyes are brilliant, and the white of the eye is sky-blue. The following symptoms are also present: great weakness, breathlessness, palpitation of the heart, tendency to fainting, increased acidity of the gastric juice, constipation; slight puffiness of the eyelids, face, and ankles; menstrual disturbances, hysterical outbreaks, headache, neuralgia, and fever may be present in some cases. On raising the eyebrows horizontal folds on the forehead may be absent. This disorder is often recognized at a glance. The prognosis is favorable.

Treatment.— An outdoor life. Sunshine, fresh air, and abundance of exercise are exceedingly important. The diet should be nutritious, and food should be selected that contains organic iron, such as cereals, thoroughly toasted or dextrinized. Strawberries and tomatoes and spinach contain more iron than any other foods. A dry diet with fruits will also correct the hyperacidity of the stomach, and constipation. Hydrotherapy is of very great service in the treatment of chlorosis, especially the daily cold morning bath, moderated to the patient's condition. The daily cold friction will stimulate the heart and blood-making organs, and arouse every organ to new activity. The cold wet sheet pack continued for fifteen minutes is another efficient measure. Fomentations to the spine with hot and cold to this region will be tonic in effect. (See Nos. 184, 185, 170, 189.)

There is no question that iron is of great service in the restoring of the hemoglobin in chlorosis. The reports of thousands of cases have clearly demonstrated this clinical fact. The organic combinations of iron as mentioned above will meet the needs of most cases.

PROGRESSIVE PERNICIOUS ANEMIA

CAUSES.— Very obscure. It occurs when there has been no previous hemorrhage or loss of blood. It is probably due to some poison or toxin generated in the body. Some consider it to be due to a disease of the sympathetic nerves, others to gastric disturbances.



SYMPTOMS.—Emaciation is not common. The patient usually has had dyspepsia. Comes on slowly; the countenance is pale, the eyelids and lips are white, the muscles are flabby; there is great weakness, faintness, breathlessness, palpitation; the heart is weak, the pulse rapid, the appetite poor. The patient may pass into a semitorpid condition. At times fever is present.

The blood shows the most marked changes. The red blood-cells may be reduced from five million, the normal number of red cells in one cubic millimeter,[1] to five hundred thousand. There are also marked changes in the bone marrow. Fatty degeneration of the liver, kidney, and heart muscle is often present. The prognosis is very grave. The patient may linger from a few weeks to a year or more.

TREATMENT.— The patient should go at once to a well-equipped sanitarium, where the most rational treatments can be obtained. Iron is of little use in such cases. Arsenic should be avoided, for any temporary effect only makes the end more certain from the use of this poison. Good results have been obtained from the proper application of the principles of hydrotherapy, and other remedial measures.

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[1] A space equivalent to a cube one twenty-fifth of an inch on a side.

SECONDARY ANEMIA

CAUSES.— Hemorrhage from any cause, marked diarrhea, protracted fevers, gastro-intestinal disturbances, bad air, poor food, organic diseases, poisons, general debility.

SYMPTOMS.— Pale skin, loss of strength and flesh, weak heart, rapid pulse, quick breathing, air hunger, headache, dizziness, faintness, some dropsy of the feet, restlessness, peevishness, mind easily irritated.

TREATMENT.— Remove the cause if possible. Graduated exercise, breathing exercises, wholesome, nourishing food, proper rest and sleep, fomentations to the spine, and over the liver and spleen, also hot and cold compresses over these regions, cold friction to the skin twice daily. (See Nos. 170, 189, 184.) Drugs should be avoided, as they will not particularly benefit this condition. Blood medicines are a delusion and a snare. There is a popular belief that drugs purify the blood,— that humors, scrofula, and other diseases can be swept out of the blood by blood purifiers. Thousands of drug-patronizing persons are robbed of their money every year by spending it for the worse than worthless so-called blood medicines on the market.

The Bible tells us that the blood is the life. Hence, it must be able to purify itself by the natural foods which nature intended for it; namely, pure air, pure food, and pure water. Water freely used is the best blood purifier in the world. It cleanses the impurities of the blood just as readily as it cleanses the face. Who would think of washing the face with a blood purifier! The very suggestion is absurd. If the blood is to be made pure, it must be furnished with pure food; for the blood-making organs can not make a good quality of blood from the food eaten by the majority of people. Those who eat diseased meats, pork, greasy fried foods, hot, doughy breadstuffs, and condiments, can not expect to have pure blood.

LEUKEMIA

In leukemia there is a marked increase of the white blood-cells, with an enlargement of the spleen; and in pseudo-leukemia, or Hodgkin's disease, all the lymphatic glands are enlarged without increase in the number of white blood-corpuscles. So little can be accomplished for the patient, even under the best of circumstances, that the writer does not deem it wise to give a description of the disease, or to attempt to suggest treatment for it.

ADDISON'S DISEASE

This disease is thought to be due to tuberculosis of the suprarenal bodies. It is indicated by a slow onset, early weakness, weakness of the heart, short breath, irritability of mind, marked exhaustion on exertion, followed by noises in the ears, and a marked bronzing of the skin and mucous membranes. The color may be from a yellow to a dark brown. Indigestion is marked.

The prognosis is grave. The duration of the disease is about two years. Some cases have lived six to ten years after the pigment appeared.

TREATMENT.— The treatment to be given in this disease is purely symptomatic. Such patients should be advised to go to a sanitarium, where the proper care can be obtained.

SCURVY

SYNONYM.— Scorbutus.

CAUSES.— Lack of fresh vegetables and fruits. Formerly was common among sailors, on long voyages. Cases are now reported in the Klondike. Excessive eating of salt pork, fish, and canned meats, or an exclusive cereal diet will cause the disease. It is rare in this country. It occurs in some parts of Russia.

SYMPTOMS.— Prostration, disgust for food. The gums

become soft and spongy, with bleeding. The teeth drop out. The breath is foul, and the tongue swollen. Hemorrhages are common. Fever is present. The patient passes into a most pitiable condition.

Treatment.—A return to fresh vegetables and fruits will correct the disorder. Cleanse the mouth with a one-per-cent solution of carbolic acid, or use listerine.

Infantile scurvy occurs during the first year of life, and is usually due to feeding with artificial foods. A milk diet is necessary in such cases, with orange juice or scraped apple during the intervals. Two or three teaspoonfuls of orange juice a day is all that is necessary. Give a salt sponge daily.

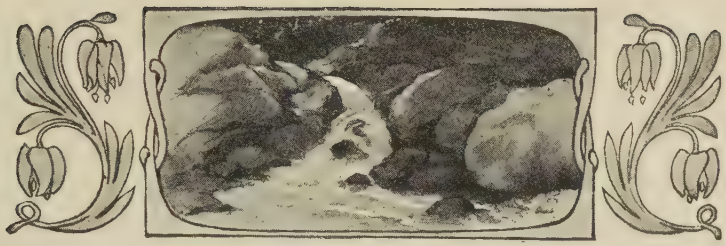
HEMOPHILIA

In this condition there is a strong and abnormal tendency to bleeding, or hemorrhage. Persons having this tendency are called bleeders.

Causes.— Heredity. The disease is transmitted by the mother, who is rarely a bleeder, to her sons. In this disease the blood seems to lack the function of coagulating.

Symptoms.— A small cut or bruise is followed by an uncontrollable hemorrhage, not a profuse bleeding, but a constant oozing. In the majority of cases the bleeding is nosebleed. Patients rarely die in the first bleeding.

Treatment.— Guard from all injuries, and avoid all operations. Apply pressure to a bleeding surface by means of the fingers. It must be constant. The writer knows a mother who saved the life of her son by applying constant pressure to a cut surface for seventy-two consecutive hours. In nosebleed, ice should be applied to the nose and to the neck. Plugging the nose will probably be necessary. On an easily accessible bleeding surface, fresh blood from another person will coagulate and at times stop the bleeding. As the blood is made from the food, it is possible that this condition may be changed by proper diet.



CHAPTER XXVIII

Constitutional Diseases

CHRONIC RHEUMATISM

CAUSES.— This is a disease that occurs rather late in life. It is most common between forty and sixty years of age, and women are the more frequent subjects. It may be caused by cold, damp, poorly ventilated rooms; by sleeping in a damp, chilly bed, such as the unused spare bed often reserved for the itinerant minister. Poverty, social miseries, exposure to the inclemency of the weather, are common causes. Excessive meat eating is no doubt a marked predisposing factor; for there is a faulty tissue change, with the retention of waste products in the muscles, joints, and nerve-centers. These poisons produce irritation, which in turn causes a thickening of the tissues about the joints; this may produce an alteration in the form of the joint, even interfering with its motion.

SYMPTOMS.— Pain in the joint may come on insidiously, attended with stiffness. The joints are tender to the touch, and sore, any movement aggravating the trouble. The joint may be hot to the touch, showing a local state of inflammation. Complete stiffness of a joint may occur, and the pain frequently is very severe, exhausting the patient. The dis-

case may endure for years. Or it may come in frequent attacks during the winter months.

Treatment.— A dry, moderately warm, even, and sunny climate is the best place for a rheumatic. Internal remedies are of little use. Liniments are useless as such; the only value attached to any such remedy is the rubbing and friction necessary to apply the medicine.

Every possible means should be used to maintain the general health and to increase the vital energy. The diet should be carefully regulated. A rich diet should be avoided. The bowels should be kept active by regulating the diet and by the enema if necessary. Several pints of water taken in small quantities should be drunk daily.

The pain is best relieved by the hot pack, repeated or prolonged if necessary. The trunk pack, hip pack, leg pack, or the pack to the knee or shoulder, affords great relief. Very hot fomentations continued for an hour are all that is necessary in many cases. The prolonged neutral bath is excellent. At bedtime wrap the joint, if one of the smaller ones, in a cold compress, covered with mackintosh or oiled silk and two thicknesses of flannel. Repeat for several nights. (See Nos. 175, 177, 176, 170, 174, 186.) Electricity is not of the greatest service, though in some cases the galvanic current gives relief, also static treatments. Massage in rheumatism has accomplished excellent results. It stimulates nutrition, assists in the elimination of waste products, quickens the circulation, and by its use in many cases a stiffened joint may be restored to its normal function. Massage is especially useful when there is a wasting of the muscles.

A cabinet bath may be improvised, and a good sweat taken once or twice a week, following it with cool sponge bath and an oil rub, and avoiding exposure afterward.

Many rheumatic and stiffened joints have been greatly helped by the use of high, dry heat. A special apparatus is necessary.

Active exercise, to the point of perspiration, favoring active elimination, is a good preventive of rheumatism.

MUSCULAR RHEUMATISM

This is a painful affection of certain groups of muscles. The muscles most frequently involved are, first, the large muscles in the back, when the disease is called lumbago; second, the intercostal muscles, when it is called pleurodynia (frequently mistaken for heart-disease); third, certain muscles of the neck, causing stiff neck, or torticollis.

CAUSES.— Most common in men exposed to cold, to draft, and chilling after exertion. It is considered by some to be due to a disease of the sensory nerves in the muscles.

SYMPTOMS.— Severe pain in the affected muscle, increased by any movement or exertion. At times the pain is severe, like the cramping of a muscle. An attack usually lasts several days. In lumbago the pain may even prevent a patient from turning in bed.

In pleurodynia the pain is a more aggravating feature, for every breath or cough increases it. Often the pain is diffuse.

In stiff neck the head is drawn to one side and can not be rotated.

TREATMENT.—Hot packs, very hot fomentations for twenty minutes three times a day, the hot bath or the prolonged neutral bath, and electricity, are effectual. (See Nos. 175, 170, 173, 174.) Galvanism is the best form of electricity; but the strong static spark will often give relief in case of lumbago. A mild faradic current applied for twenty to thirty minutes has cured the attack in one treatment. In giving galvanism apply a large positive electrode over the painful area on the back, and the negative pole to the abdomen. To the neck apply a small positive electrode ten minutes, using ten milliampères of current.

In stiff neck, massage is one of the most successful meas-

ures. At times a special apparatus is necessary if the stiff neck is permanent. Rest is important. The body should be well clothed, and exposure avoided. Meat, tea, coffee, and alcohol should be avoided, also overeating. A diet of fruits, cereals, and vegetables should be adopted.

ARTHRITIS DEFORMANS

Synonyms.— Nodular rheumatism, rheumatoid arthritis.

This is a chronic disease of the joints, characterized by enlargement and deformity, usually beginning in the small joints.

Causes.— It occurs more frequently in women than men, and is infrequent under twenty. The real cause is obscure, but a number of cases have been traced to prolonged, obscure suppuration. In this case the white blood-cells are greatly increased in number, and these in turn break down into waste products, called leukomains, and other poisons, which act as irritants in the tissues, especially around the joints, where the circulation is slow and easily cooled because of the nearness of the vessels to the surface. Lowered vitality, anxiety, worry, fatigue, exposure to wet and cold, may be causative factors. It is as common in the rich as in the poor.

Symptoms.— May come slowly or abruptly, with acute, painful swelling of the small joints of the fingers. The joints are red, hot, and very tender, and any movement causes excruciating pain. The acute attacks come in paroxysms of variable duration from one to several days, each time leaving the joints in a more deformed condition. I have known an attack to come on in a very few minutes, or following great mental exertion. In time the wrists, feet, and larger joints become enlarged, deformed, and immovable. The muscles above the joint waste away. The skin is shiny and glossy. The disease progresses slowly until the patient is absolutely helpless. The writer recalls a young man whom he treated while a medical student, who could not move a single joint

without torturing pains. Even the jaw-bones could not be moved. In one form of the disease little hard knobs develop at the sides of the joints. At times the disease is stayed after involving two or three joints. In nearly all prolonged cases the pain finally disappears. Cure is rare.

TREATMENT.— If this disease is taken in time, much can be done toward staying its progress. Medicines are useless, and only impair the digestion, thus further handicapping the patient. The daily prolonged neutral bath, beginning at 95°, and at the end cooling to 88°, with friction, is a most effectual measure. Or instead of the full bath the wet sheet pack, prolonged into the second or neutral stage, is one of the next best measures. (See Nos. 174, 184, 185.) During an acute exacerbation there is little that can be done to relieve the pain. Fomentations, cold compresses, galvanism, and cataphoresis should all be used. Massage is a most valuable measure in this disease. The patient should be encouraged to spend several hours in the open air and sunshine daily. If not able to walk, place in a chair or on a cot in the open air.

GOUT

This is a disease that has prevailed all through the centuries, being mentioned even in the Sacred Writings.

CAUSES.— The disease is rare in warm climates and among persons in whom the excessive indulgence of food and drink is precluded by temperate lives. It is most common in temperate climates, among the luxurious inhabitants of cities, where civilization, wealth, and pleasure are carried to the highest degree. The disease was common among the debauched Romans. It is now most common in England, Germany, Holland, France, and America. It is more common in men, following excessive consumption of wine, gin, and rum; debauchery, physical and mental fatigue, loss of sleep, lack of exercise, too free indulgence in the pleasures of the table. In many cases, heredity is an important factor.

The exact nature of the disease is not known. Faulty tissue changes, with an excess of uric acid in the blood and tissues, are always associated with the disease. Uric acid is a poison that naturally is eliminated from the body when there is a state of health. When meat in large quantities and alcoholic drinks to any degree are used, or in overeating, more uric acid is produced than is eliminated. In the course of years this may amount to a considerable quantity. In the gouty state, uric acid is retained in the body because of faulty activity of the kidneys and diminished oxidation. Little by little it is precipitated in the tissues and about the joints in the form of urates.

Symptoms.— *Acute.*— Follows a winter of gaiety and dissipation, and exposure to cold and fatigue, preceded by coated tongue, foul breath, acid stomach, constipation, headache, nervous irritability, impatience, ill temper, languor; the patient is chilly, has some pain, and is uneasy. During the early hours of the morning he is awakened by a torturing pain in the large joint of the great toe. It is hot, red, and swollen, and the cold night air is very refreshing, so the foot is usually protruded from under the bedclothes. Pain is less severe during the day. The attack lasts several days.

Chronic.— Persistence of pain in the foot. Difficulty in walking, pulse is rapid, blood-vessels are hard, the kidneys usually become diseased. Intervening acute attacks may occur. Deposits of urates appear in the ears and about the knuckles. Headache and neuralgia are common. Fatty degeneration of the liver occurs, and cirrhosis is common. Apoplexy is a frequent termination.

Eczema is a skin affection frequently associated with gout. It occurs upon the face, forehead, joints, and about the genital organs. Other skin affections are herpes, psoriasis, urticaria, and carbuncles. Diabetes and gout are frequently associated.

Treatment.— The best treatment is preventive. If all excesses are avoided, but little fear of gout need be entertained. The diet should be nutritious and unstimulating; meat, alcohol, tobacco, sugar, pastry, and overeating must be avoided. Use water freely. An active outdoor life should be encouraged. Avoid fatigue. Keep the bowels in good condition. If any benefit results from drinking mineral water, it is due to the water and not to any mineral that it may contain. Eczema and other affections should be bathed with hot alkaline water or soda-water, and if the irritation continues, carbolized vaselin should be applied.

In an acute attack, take hot enemas, 110°, hot leg bath, following with cold compresses, 60°, over the foot, changing as soon as warm. (See Nos. 195, 171, 186.)

In the chronic form, the patient should dress warmly, and secure good elimination by keeping the bowels open, and taking one or two thorough sweat baths a week, avoiding exposure afterward. (See Chronic Rheumatism.)

DIABETES MELLITUS

In this disease sugar is present in the urine because of marked disturbances of nutrition.

Causes.— Diabetes, like Bright's disease and other organic diseases, is on the increase because of living under high pressure, and because of dietetic transgressions. It is more common in men than women, and is not common under thirty years of age. Overeating, excessive consumption of sweet foods, alcohol, worry, nervous strain, close application to business, sedentary habits, and lack of exercise, diseases of the liver, of the pancreas, and of the brain, with defective assimilation, are all considered causative factors in diabetes. Obesity favors diabetes. It is more common among the Jews than any other race.

Normally the blood contains about two-tenths per cent of sugar. Any increase of sugar over this amount is eliminated

by the kidneys, and appears in the urine. The starchy foods eaten are stored in the liver and muscles as glycogen, or animal starch. When needed, this is converted into sugar and oxidized, thus supplying energy to the body. In diabetes this function is interfered with, and the carbohydrates, or starchy food, and even proteid foods, are converted into sugar. The blood is highly charged with glucose. Oxidation is imperfect, and so the kidneys eliminate large quantities of sugar through the urine. A trace of sugar may appear in the urine following the excessive consumption of carbohydrates and sweet foods, though purely temporary in effect.

Symptoms.— Frequent urination and great thirst first attract the attention. The onset is gradual, except in acute cases occurring in the young. There is progressive weakness, loss of flesh, an inordinate appetite, mental depression, dyspepsia, a dry red tongue, a dry skin, boils, neuralgia, constipation; and late in the disease the breath is significant because of acetone in the blood and urine; it smells like rotten apples. The patient is irritable, morose, and often very restless. The sight is impaired.

Complications.— 1. *Skin.*— Boils, carbuncles, inflammation of the skin, intense itching, frequently about the genital organs, because of the deposit of sugar. Eczema at times.

2. *Lungs.*— Tuberculosis is a frequent complication. Pneumonia often carries the patient off.

3. *Nervous System.*— Periods of unconsciousness, or what is called diabetic coma. A fully developed coma is characterized by complete unconsciousness. This is preceded by dizziness. Neuritis may occur.

4. *Kidneys.*— Albuminuria frequently develops.

The Urine.— In diabetes the urine varies from six or eights pints to forty pints in twenty-four hours. It has a light, sirupy color, and a sweetish odor and taste. From ten to twenty ounces of sugar is excreted in twenty-four hours.

Duration.— In children the disease runs a rapid course. Under forty prognosis is bad; in older persons the disease is amenable to treatment, and the patient may continue to live many years. By proper treatment the sugar may disappear, but the condition will return.

Treatment.— *Diet.*— Mild cases of diabetes can be controlled by a proper diet. All foods containing sugar must be avoided. Foods containing starch must be restricted, but not entirely withdrawn. It is not necessary to entirely refrain from eating carbohydrates. The following list includes foods that may be eaten: Gluten, gluten biscuit, gluten wafers, cocoanut biscuit, almond meal, bran bread, nuts of all kinds, with the exception of chestnuts, beans, lentils, dried peas, eggs, butter, cream, koumiss, buttermilk, asparagus, spinach, lettuce, tomatoes, celery, lemons, oranges, raspberries, strawberries, blackberries, peaches, plums, apples.

An exclusive meat diet should be avoided. There are probably exceptional cases when meat in moderation would not do harm. In such cases the best meats should be selected, such as fresh beef, poultry, mutton, or game.

Avoid eating rice, breads, corn, corn-meal, potatoes, unless baked, vegetables, sweetened foods of all kinds, jams, tea, coffee, cocoa, wines, beer.

In the dietetic treatment of diabetes it is well not to cut off the carbohydrates too suddenly; furthermore, a patient should not be kept on a restricted diet too long at a time, for naturally man's diet is two-thirds carbohydrates, and any prolonged departure from this must necessarily result in nutritional disturbances. After the sugar has disappeared from the urine, or only a trace is found, the patient may partake moderately of starchy foods, such as baked potato, browned rice, and whole wheat or Graham bread.

General Measures.— The oxidation of the excessive quantity of sugar may be increased by graduated exercises,

avoiding violent exercise. Walking and gymnasium exercises are best, breathing exercises several times a day, and Swedish movements. Massage is of great importance. All nervous excitement should be avoided. Encourage abundance of sleep, and hygienic living.

The patient should lead an outdoor life, and when practicable sleep in the open air,— in a tent, on a porch, or in a tent-window. The object of this is to increase oxidation and allay nervous excitement.

The skin should be kept active by cold friction, beginning moderately, the cold shower bath with vigorous friction, the wet towel rub, hot and cold to the spine and over the liver, fomentations to the stomach, and neutral bath from 97° to 92° for fifteen to twenty minutes when the skin is very irritable, followed by an oil rub (sweet-oil). For diabetic coma, give a hot blanket pack for ten or fifteen minutes, with cold compresses to the head. The bowels should move daily; give an enema at 80° if necessary. (See Nos. 184, 189, 170, 174, 175, 186.)

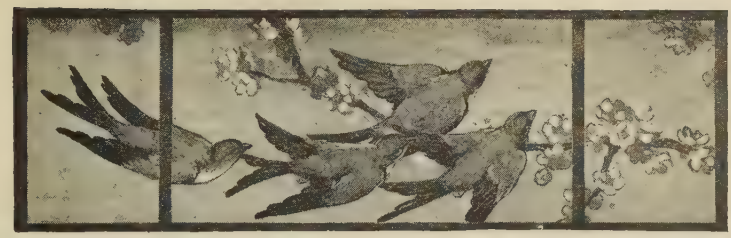
DIABETES INSIPIDUS

Synonym.— Polyuria.

Causes.— The disease occurs in the young. It may be caused by great emotion, fright, fevers, injuries, tumors of the brain, drinking large quantities of water. It may be hereditary. It occurs in hysteria.

Symptoms.— Passing large quantities of light-colored urine, light in weight, and containing no sugar. Excessive thirst. The disease is of long duration. Spontaneous cure may take place.

Treatment.— Outdoor life, and exercise. Tonic treatment, such as cold friction, fomentations to the spine and liver, the cold towel rub, salt glows, saline sponges, hot and cold sprays to the spine and liver, a careful diet, electricity to the spine and muscles, abundance of sleep.



CHAPTER XXIX

Diseases of the Nervous System

PAIN

Pain is to the body what the violated conscience is to the soul. It is "nature's kind harbinger of mischief." It is one of nature's sign-boards of danger. Pain "is a fruit that, unsuspected, ripens within the flower of the pleasure which concealed it." Only by means of the special senses do we experience either pleasure or pain, and every sense that may conduce to our pleasure has an equal penalty attached to its abuse. The dividing line between pain and pleasure is a difficult one to determine, for what would be pleasure to one individual would be pain to another. Any pleasurable sensation if continued to excess will become painful, for the overstimulation of any sense causes pain.

The person who regards the senses as servants, and treats them wholesomely, will be compensated by enjoyment and pleasure; but if he becomes a servant to his senses, all nature's laws are outraged, and his senses turn upon him and become his tormentors.

Pain is a blessing in disguise. It is not an unmixed evil, even though it is a penalty for physical transgression. Overindulgence in the pleasures of the table, sitting long at the wine cup, and neglecting exercise, are pleasures that must

bow with humble submission to the torturing pains of headache, backache, rheumatism, neuralgia, and gout. The glutton must pay for his intemperance by suffering the excruciating protest of an abused stomach. It would, indeed, be a great boon to many a gastronomic sinner if he always had a sensitive stomach; for those who suffer pain after eating food, if they rightly interpret pain, are less likely to make digressions in diet.

Pain is not only a dispensation, but, if heeded, a compensation. Every child is better off for wise correction; so pain may be taken as nature's loving correction. Before gold can be purified, all the dross must be consumed; the most beautiful characters are those that have been refined by suffering. It was said of Job after his many afflictions, "There is none perfect on all the earth like Job."

Sympathetic Pain.— Pain in any part of the body, and especially in the different organs where the sympathetic nervous system is involved, gives rise to sensations of heat, weight, fulness, heaviness, constriction, oppression, burning, dulness, uneasiness, tenderness, pricking, and stinging.

Somatic Pain.— Pain carried by a cranial or spinal nerve, or having its origin in any part of these nerves, is characterized by such adjectives as darting, tearing, lightning, stabbing, gnawing, boring, aching, throbbing, and sharp.

Reflex Pain.—When a pain is reflected, it appears in some part of the body remote from its origin. Irritation of the solar plexus behind the stomach may cause headache, pain in the back, between the shoulders, or under the shoulder-blade. Inflammation of the ovaries causes pain in the chest and shoulder of the same side, in the scalp, back, and thigh. Biliary colic causes pain under the right shoulder-blade, and in the abdomen; renal colic causes pain in the abdomen, penis, perineum, and testicle; pneumonia frequently causes pain in the abdomen of the same side;

pleurisy may produce pain in the region of the stomach; organic heart-disease frequently is manifested by pain in the left shoulder and down the left arm to the fingers; intercostal neuralgia causes pain about the heart; pain from the duodenum is felt under the liver, and is frequently mistaken for liver complaint; disease of the hip-joint causes pain in the knee.

Location of Pain.— Pain is usually referred to the sensory nerve-ending. If a nerve-trunk or a nerve-fiber is irritated, the pain is felt at the end of the nerve. When we strike the so-called "funny-bone," the pain is not at the elbow but in the little finger and the ring-finger. Pain is not really felt in the nerve-ending, but in the sensory part of the brain. If a nerve to a certain part is cut, no pain can be felt in that part, even though it be touched with a red-hot iron. Pain may be entirely confined to the brain, and yet be referred to some part of the body. Hysterical patients have even had legs and fingers amputated because of pain that resided in the brain entirely, and yet was referred to these parts. A person who has had a leg amputated may, during bad weather, feel the pain of a corn or a joint that long ago underwent decomposition. The nerve-stump is irritated, and the pain is referred to the end of the nerve, just as if the leg and foot were present.

Evils of Pain.— Pains are troublesome, injurious, and evil in their effects upon the patient to the extent that they interfere with his rest, rob him of sleep, take away his appetite, exhaust his nervous system, depress functional activity, and aggravate any local disease.

Benefits of Pain.— Pain indicates disease, and its presence causes one to seek relief at once. Pain has saved thousands of lives. It indicates to the patient what the danger-signals do to an engineer,— the engine must be stopped and reversed. There is great danger in the absence of pain in disease, for grave changes may take place unnoticed, as is

the case in many organic diseases. Pain is of great importance to the physician, for it enables him to locate disease, and to determine its nature. Pain calls for rest. If not regarded, lasting injury may be done. Pain prompts various measures for relief, such as pressure, rubbing, pinching, or putting the finger in the mouth; or it may cause crying, which is a great relief, and lessens the pain, in many cases. The louder the crying and the deeper the breathing, the more the mind is distracted from the pain. Pain, when severe, produces a dread of its return, and so stimulates one to avoid it in the future. Pain develops patience in the sufferer and sympathy in his friends.

Treatment of Pain.— The fundamental principle in the treatment of pain is to remove its cause. There is an alarming tendency in this day, on the part of both the patient and the physician, to stop the pain by some narcotic or opiate, and not to seek for the cause. Pain is an important indication, and when suddenly dissipated by a drug, the life of the patient may be endangered. To stop pain with opium is like killing the watch-dog for barking and disturbing your sleep when thieves are about. To stop pain with drugs, letting the matter rest there, is like crying, "Peace and safety," when there is none. Drugs may depress the sensory receiving centers, but the cause of the pain continues just the same.

It is perfectly rational to relieve pain, while seeking the cause. Pain, if due to inflammation, in the first few hours is best relieved by an ice-bag or cold compress, alternating occasionally with fomentations, followed later by very hot applications. Deep-seated pain, or pain that is due to irritation or to poisons, can in the great majority of cases be relieved by very hot fomentations and hot packs, and by measures that will draw the blood into other parts of the body. This subject will be more fully considered under separate headings.

HEADACHE

Headache is a symptom, and not a disease. As it is one of the most common nervous symptoms, however, we will consider it as a separate subject. More than fifty per cent of women are subject to some form of headache, twenty-five per cent of men, and from ten to fifteen per cent of children. Headaches increase gradually through the developing periods of life to full maturity.

Nearly every woman to-day, from the highest to the lowest, has her headache powder near at hand, ready for immediate use. There is no doubt that the swallowing of so many unknown mixtures is a common cause of headache, for no drug can cure the symptom. It only obscures it, or, by depressing the nerve- and brain-centers, causes the mind to become unconscious of the pain, without removing the cause. Thousands of headache cures on the market to-day are a curse to the present generation. Many of them contain opium in some form, and are direct agents in establishing the opium habit. Some contain cocain, and are equally dangerous preparations. Antikamnia and all like pain-killers should be avoided. A headache treated with drugs is only made a more frequent condition, and after the headache is past, the depressing influence of the drug must be recovered from. Many take headache powders at night, and are sick at the stomach the next morning or the next day, with no appetite, and a feeling of languor and good-for-nothingness. The after-effect fully balances the temporary relief that may be experienced. Headache cures guaranteed to cure in five or ten minutes are dangerous mixtures, and should be avoided.

REFLEX HEADACHE

Causes.— Diseases of the stomach and bowels are a very prolific source of headache. Hyperacidity of the stomach, fermentation, and poisons in the stomach from retained or

decomposed food, intestinal fermentation, constipation, dilatation of the stomach, and prolapsed stomach and bowels, are the cause of a large share of the headaches so common to-day. Increased acidity of the stomach irritates the delicate walls of the stomach; dilatation of the stomach causes retention of food, followed by decomposition, and absorption of the poisons by the blood, which in turn irritate the nerve-centers of the sympathetic system as well as of the brain. Prolapse of the stomach and bowels stretches the nerves connected with the solar plexus behind the stomach and the fibers connected with the semi-lunar ganglia and lumbar ganglia. A headache that usually comes on an hour or two after eating indicates either increased acidity or dilatation of the stomach, or both. A headache due to prolapse of the stomach and bowels will be relieved by lying down, with the hips elevated.

A sluggish liver, with retention of bile, or a slow elimination of bile along with the feces, is another cause of reflex headache. Headaches due to disease of the digestive organs are usually frontal headaches.

Ovarian and uterine diseases are the causes of many headaches in women, especially during the menstrual period. Such reflex pains are usually felt at the top of the head.

Eye strain is a common cause of headache in the young, due to defects in the refraction of the eye. Such pains are aggravated by reading or sightseeing, and may be associated with dizziness and vomiting. The pain is most marked at the temples and at the back of the head.

Nasal catarrh often causes reflex headache, which is indicated by a dull pain between the eyes and over the eyes.

Treatment.— Remove the cause if possible.

1. For constipation, take a thoroughly cleansing enema. Many cases of headache will be relieved by this measure, frequently in a few minutes. (See Constipation.)

2. For gastric disorders, correct the diet. (See Treatment for Gastric Catarrh.)

3. For dilatation of the stomach, if in the evening, wash out the stomach, or drink freely of warm water, and vomit. (See Treatment for Dilatation.)

4. For prolapse of stomach and bowels, wear an abdominal supporter. This will give great relief. Strengthen the abdominal muscles by exercise.

5. For biliousness, wash out the stomach. In many cases this is all that is necessary. If this is not possible, drink several cups of hot water; abstain from food for twenty-four hours. If there is constipation, a hot enema in the knee-chest position should be given. (See Biliousness, page 527.)

6. For eye strain, consult a specialist.

7. For uterine or ovarian disease or congestion, see treatment under these subjects.

Congestive Headache.— In this condition there is congestion of the brain, which may be acute or chronic.

Acute congestion is due to great mental excitement, emotion, crying, prolonged mental effort, fevers, exposure to the sun, tea, coffee, overeating, to poisons, to heart-disease, and to Bright's disease.

Passive congestion is due to some obstruction, as a tumor, to alcoholism, to heart-disease, and to very old age.

Symptoms.— Throbbing of the head, "as if the head would burst," "a splitting headache," increased by lowering the head or by exercise; the face is hot and flushed, the head is hot, the eyes are injected with blood.

Treatment.— Hot enema, hot foot bath, with a towel wrung out of ice-water around the neck and over the face and head. (See Nos. 195, 171, 186.) Rest, with head and shoulders elevated. Abstinence from food. In fevers the headache may be relieved by giving the patient a hot hand and arm bath for a few minutes. In some fevers, such as typhoid, and in pneumonia, it is very difficult to relieve the headache at times, as the pain is due to poisons generated by the disease.

Headache due to increased blood pressure and rapid heart action will be relieved by an ice-bag or a towel wrung out of ice-water applied over the heart for fifteen minutes, with cold applied to the neck and head at the same time.

Very often sleep is a much more efficient remedy in relieving headache than any drug prescription.

If congestive headache is due to overeating, the pain may be relieved by fomentations over the stomach and liver. If this treatment does not give relief, the sufferer should drink freely of warm water and then tickle the throat with the finger. Vomiting, by exciting the circulation, may increase the headache for a few minutes, but it will soon subside.

If the headache is due to great mental effort, some form of vigorous exercise will divert the blood from the brain. If headache returns whenever study is undertaken, the eyes should be examined.

It has been said that one grain of pain overbalances a ton of health, and one is very much inclined to believe this when he has a "splitting headache." This has led to much promiscuous drug taking, which affords only temporary relief. When attacks of headache grow in frequency, the cause should be sought for and removed. Headaches are probably more exhausting to the nervous system than any other form of pain. A determined effort to ignore pain often mitigates or counteracts its effect. Recognize and give attention to the pain, and it becomes more acute.

Anemic Headache.— The pain is of a gnawing character, with a sensation of weight, due to an impoverished condition of the blood, following hemorrhage or any exhausting disease. This type of headache occurs in those who are suffering from nervous exhaustion, from overwork, from sexual excesses, from excitement. The patient is usually pale, and has poor circulation, indicated by cold feet and hands, and fainting spells. In anemia the blood-vessels lack tone, and are relaxed.

Treatment.— A warm fomentation to the scalp, with cold friction three times a day. Tonic treatment, such as hot and cold to the spine, hot and cold over the spleen and liver, daily morning sponge, if the strength will permit, the wet sheet pack every other day, the salt glow twice a week, outdoor exercise, breathing exercises, and a wholesome, nourishing diet, with abundance of sleep if possible. Fomentations to the back of the neck and upper spine at bedtime. Apply fifteen to thirty minutes. (See Nos. 170, 184, 189, 179, 185, 190.)

Headache in Organic Diseases.— Bright's disease is frequently aggravated by a severe headache, due to an increased blood pressure. The pain is dull, and associated with a feeling of fulness. This type of headache is best relieved by the neutral bath at 97° or 93°, or the warm pack. A constant headache may indicate a brain tumor, or a brain abscess. Headache is common in gout, rheumatism, chronic malaria, and alcoholism.

Hysterical headache is a frequent manifestation of hysteria. It seems to increase at the menstrual period. It is usually a localized pain, and is likened to a nail being driven into the head. Relieve with hot compress for ten minutes every two hours, following with cold compress, 60°, changing every fifteen minutes. (See No. 186.)

SICK-HEADACHE

Synonym.— Migraine.

Causes.— It is most common in women, and begins about puberty or later. In this disease branches of the fifth pair of cranial nerves are involved. Dilatation of the stomach, auto-intoxication, disease of the sympathetic system, faulty nutrition, dyspepsia, menstrual disorders, eye strain, heredity, mental and physical exhaustion, excessive meat eating, and great emotion, are all causes of the disease.

Symptoms.— Patient usually knows within a day or more

to a few hours when the attack will appear. During this time he may be depressed, have slight headache, and feel restless and out of sorts. The pain begins in the frontal region or at the back of the head, and diffuses all over one side. It is a sharp, shooting, boring, intense pain. It may pass to the opposite side of the head, or into the neck and arm of the same side. There is an extreme tenderness of the scalp to light pressure, but firm pressure gives relief. Pain is increased by jars, light, and noise. The sight is poor. There may be blurring of the vision, or flashes of light, and spasm of the pupil of the eye. The corresponding large artery of the neck and face throbs and is dilated, while the small arteries of the scalp are contracted and firm. The stomach is dilated, secretion stops, nausea and vomiting are common. This is an effort of nature to get rid of the food, poison, and bile, by which the patient is being poisoned. The patient suffers intensely, the face is pale, the heart rapid and weak. With some the face is flushed. Patient may faint, have hallucinations of sight, cramps of muscles, and numbness.

The duration of the attack is from six hours to two days. The attacks may occur every two weeks, at the menstrual period, or once in six weeks to three months.

Treatment.— At the first indication of the attack, abstain from food for twenty-four hours, or take nothing but a little fruit; wash out the stomach; take a dose of salts or castor-oil, a tablespoonful of either, followed by a thorough enema, go to bed in a darkened, well-ventilated room, and shade the eyes if necessary. With this treatment the hot foot bath or the hot leg pack may break up an attack, or at least mitigate its effects. (See Nos. 195, 171, 176.) In addition apply a towel wrung out of ice-water around the neck and over the face and head. Positive galvanism is beneficial, also very rapid vibrations.

The cause should be searched out. Avoid tea, coffee, wines, and meat, also worry and cares; take outdoor exer-

cise, and use a fruit diet, with carefulness in food combinations; take a daily morning sponge with friction, and secure abundance of sleep. The fewer drugs taken, the better. This disease can be helped by correct living. In many cases, however, treatment seems to do little good.

INSOMNIA

Synonym.— Sleeplessness.

This is not a disease but a symptom, indicating that a person is having insufficient sleep. Most patients who claim that they "did not sleep a wink last night," probably have slept several hours all told.

Causes.— The most common causes of sleeplessness are circulatory,— too much blood in the brain, and great activity of the brain-cells; or anemia, with too little blood, and loss of tone in the blood-vessels of the brain. Some patients want to sleep every time they sit down, or even while standing, and are constantly falling asleep during the day; but just as soon as they lie down at night, all inclination to sleep departs. This condition is due to a weak heart and relaxed blood-vessels. When in the upright position, gravity causes the blood to flow to the most dependent parts; but as soon as the horizontal position is taken, the blood again rushes through the brain and irritates the nerve-cells.

Congestion of the brain keeps the mind active because of the large quantity of blood circulating through it.

Prolonged or excessive mental strain is another important cause of insomnia, as seen in professional men and women, and business men who do not take exercise.

Insomnia is common in Bright's disease, with high blood pressure and irritability of the skin; in neurasthenia also; in other nervous disorders; in disorders due to drugs, as opium, cocain, chloral; in consequence of excessive drug taking, tea, coffee, tobacco, alcoholism; in heart-disease, dyspepsia, auto-intoxication, fevers, skin diseases, especially

eczema; it is caused by irregular habits, late suppers, neglect of sleep, poor circulation, cold feet; some work so hard that they can not sleep. It is common in insanity. Constipation is a frequent cause of sleeplessness and restlessness in infants and small children.

Treatment.— 1. *Cerebral Congestion.*— Hot foot or leg bath, or hot leg pack with a cold compress around the neck, and on the head and face; or apply a rubber bag filled with cold water to the head. This may be reinforced by diverting the blood into the arms by a hot pack at bedtime. (See Nos. 171, 176, 186, 175.)

2. *Cerebral Anemia.*— Fomentations to the spine with cold friction at bedtime. Tonic treatment during the day. In some the cold friction at bedtime causes too much stimulation, hence is to be avoided. (See Nos. 170, 184, 190, 185, 189.)

3. *Nervousness.*— From Bright's disease, and irritation of the skin. Give the warm bath at 100° for twenty to thirty minutes, cool to 88°, dry, and put to bed at once with as little exercise as possible. Large fomentations to the spine for fifteen to twenty minutes are frequently all that is necessary. Sponging the body with hot water will often produce sleep. (See Nos. 173, 170, 179.)

Sleep may be induced by drinking a cup of warm water, milk, malted milk, or a little gruel just at bedtime.

If sleeplessness is due to cold feet, bathe them in cold water at bedtime, and then rub vigorously. No one with cold feet can sleep. The moist abdominal girdle applied at bedtime is another excellent measure. (See No. 188.)

Static electricity in the form of the static breeze in the evening will relieve nervousness and quiet the patient, helping him to sleep.

See that the sleeping room is kept quite cool, that it is thoroughly ventilated, and that not too many covers are on the bed.

NEURALGIA

Neuralgia is a pain radiating along the nerve-trunks.

Causes.— Nervous exhaustion, exposure to cold, nervous temperament, most common in women, faulty elimination, poisons in the blood, uric acid, dilatation of the stomach, decayed teeth, polypi in the nose, lead-poisoning, diabetes, anemia, or impoverished blood.

Symptoms.— Uneasiness and a tingling sensation. Great tenderness over the affected nerves, pain on pressure. Pain is intense and of a shooting and stabbing nature. The attack may last from a few minutes to several days.

FACIAL NEURALGIA

This is one of the most common forms of neuralgia. It involves the trunks of the fifth pair of cranial nerves. It is due to reflex irritation from the stomach, from a decayed tooth, from exposure, from eye strain, from diseases of the nose, and from changes in nerve-centers. The hair may turn gray.

Treatment.— Hot enema, 110°, hot foot bath, cold compress around the neck and a fomentation over the affected side. Placing the opposite hand and arm in very hot water for half an hour will frequently take away the pain entirely. Large doses of castor-oil, which contains a harmless sedative principle, have been used with good results. The first dose acts as a laxative, but subsequent doses do not have this effect. A dose of from two to three tablespoonfuls should be taken each evening at bedtime. The menthol compress is also excellent. (See Nos. 195, 171, 186, 170, 187.)

Decayed teeth should be attended to; they should either be filled or extracted. Eye strain should be corrected.

INTERCOSTAL NEURALGIA

The fifth and sixth intercostal nerves are most frequently involved, and on the left side. The pain is frequently felt

over the heart, and many patients think they have heart-disease when it is only a disease of a nerve trunk or root. In intercostal neuralgia, herpes zoster, or shingles, may be associated with it. This consists of a series of little pearly blisters appearing over the diseased nerve trunk. The blisters are grouped together, and come out in crops. The appearance of the eruption is preceded by neuralgic pains. It soon dries up.

Treatment.— Continuous hot fomentations; galvanism, applying the positive pole over the painful areas; castor-oil, as described under Facial Neuralgia. If herpes appears, apply a powder consisting of equal parts of oxid of zinc and starch, covered by a smooth, tight bandage. A menthol compress held in place by a bandage may be better in some cases. The diet should be light, and consist mostly of fruit for a few days. The static spray is excellent. (See Nos. 170, 187.)

Neuralgia that is not relieved by very hot applications may yield to cold. In this case apply compresses wrung out of ice-water, and change every minute or two; or cracked ice applied in a folded towel acts promptly. (See Nos. 186, 189.) The direct application of heat from reflected electric light is a very satisfactory treatment.

NEURITIS

Synonym.— Inflammation of the nerves.

Neuritis may be single, where one nerve trunk is inflamed, or multiple, involving many nerves.

Causes.— Cold, wounds, blows, pressure. Multiple neuritis may follow the acute infectious diseases or overwork. Exhaustion, worry, cares, and grief frequently cause neuritis of the arms and shoulders, as do mineral poisons and alcoholism.

Symptoms.— *Simple Neuritis.*— Pain, of a stabbing

character; tenderness over the nerve, burning, numbness, tingling, some loss of sensation, loss of muscular power, trembling, herpes, glossy skin.

Multiple Neuritis.— Fever 102° to 104°; intense pain in the affected parts, increased by movements; headache, loss of appetite, aching in the back and limbs, tingling, tenderness, numbness, loss of muscular power, muscles waste, the reflexes are diminished. Both forms may become chronic. Recovery is gradual. Some forms may prove fatal.

TREATMENT.— Neuritis due to alcohol can be properly treated only in a sanitarium where good nursing can be obtained. Absolute rest is important. Give the hot blanket pack to the affected parts; very hot fomentations should be applied; and the hot galvanic bath, 102°, is helpful. Wrapping the limbs and arms in thick layers of cotton covered with cheese-cloth gives relief to the patient. When the pain subsides, apply electricity and massage to the muscles. Look out for bed-sores. (See Nos. 175, 170, 200.)

HICCOUGH

This is due to irritation of the phrenic nerve, which causes a contraction of the diaphragm. It may occur in gastritis, peritonitis, strangulated hernia, gout, rheumatism, or Bright's disease. At times the cause is not known. It is dangerous when of several days' duration.

TREATMENT.— Take a deep breath, holding it as long as possible. Repeat several times. Produce sneezing. Sudden fright may stop the hiccough, but this is not recommended. A case is recorded of a bachelor who knew little about the ways of children, who sought this means of stopping the hiccough of a little child. It passed from the hiccough into convulsions. Swallow bits of ice, or ice-water; place an ice-bag over the stomach; pull the tongue out as far as possible several times; wash out the stomach. Eating

ice-cream has been known to stop hiccough. Pressure upon the phrenic nerve in the neck seems to help in some cases.

SCIATICA

Inflammation of the large nerve extending down the back part of the thigh from the hip to the knee. It occurs between the ages of twenty and fifty, and is most common in men.

Causes.— Exposure to cold or an injury may be exciting causes. Pressure in the pelvis, tuberculosis, gout, rheumatism, syphilis, hemorrhoids, overwork, and overexertion are predisposing causes.

Symptoms.— Pain is the most constant symptom; any movement intensifies it; it is shooting in character, and may extend to the toes. Symptoms are worse at night and in cold, stormy weather. Sleep is disturbed. Patient walks on the toes with bent knee. The muscles waste. Herpes, or shingles, may develop over the course of the nerve. The limb feels cold, and the circulation is poor. The disease may last from six weeks to several months.

Treatment.— Rest is the first indication. Keep the bowels open with the daily hot enema, 105°. In the beginning of the disease apply over the course of the nerve an ice-bag, or cracked ice placed in a folded towel, or ice compresses changed every three minutes. If the cold is objectionable, apply very hot fomentations from half an hour to an hour over the nerve, or give a hot blanket pack to the entire leg. Surgical procedures and marked flexions of the thigh are of little use. The galvanic bath gives relief in some cases, but should be given only under competent direction. (See Nos. 195, 199, 170, 186, 175.)

The strength of the patient should be maintained by tonic measures and massage to other parts of the body. (See Nos. 184, 189, 190.) When the pains of sciatica have practically disappeared, the leg should receive hot and cold applications, daily massage, and electricity three times a week.

APOPLEXY

Synonyms.— Stroke of paralysis, cerebral hemorrhage.

Causes.— Occurs in the aged, as the blood-vessels of the brain are brittle and rupture easily. Bright's disease, rheumatism, gout, overwork, alcoholism, excessive meat eating, habitual overeating, and obesity, are all predisposing causes. An attack may be brought on by excitement, physical or mental, or by eating a hearty meal.

Symptoms.— Premonitory symptoms are rare. Occasionally numbness and weakness are noticed on the side finally affected, and dizziness and headache are present. In most cases the attack is sudden and unexpected. The patient may suddenly drop to the floor, or fall from a chair while talking or eating. Unconsciousness is nearly always the rule. The breathing is labored, giving the impression at times of a foreign body in the throat. The face is flushed; the head and eyes may be rotated to one side; the pupils are irregular. If the patient moves, it is only on one side; sometimes the arm or leg of the paralyzed side is rigid from irritation; the urine and feces may be voided involuntarily; the temperature may fall because of the shock.

Later Symptoms.— If the attack is not fatal, consciousness is regained in the course of a few hours to two days. At the end of this time there is usually some fever. One side is paralyzed, and often the opposite side of the face is involved. The patient can not whistle, and laughs on one side; the tongue, if protruded, deviates toward the paralyzed side. The muscles become rigid from irritation, and continue so from a few days to several weeks. As a rule, sensation is not disturbed.

If the stroke is slight, recovery takes place in from a few days to a few weeks. In severe cases the leg slowly recovers before the arm. When the patient attempts to walk, he swings the affected side, to assist in drawing the foot for-

ward, and usually carries the hand across the waist, supported by the well hand. In the course of a few months the muscles of the paralyzed side waste slowly.

In some cases the patient makes a complete recovery, and not a trace of the stroke remains. The early appearance of bed-sores is a fatal indication. Apoplexy may be mistaken for sunstroke, alcoholism, opium poisoning, or uremic poisoning.

Treatment.— *Preventive.*— One who is a good subject for apoplexy, indicated by rigid arteries, obesity, and abundance of blood, should avoid all intense mental and physical exertion, and dine moderately. Constipation should always be attended to.

For the Attack.— Prop the head and shoulders; loosen the clothes about the neck; wring a towel out of ice-water and wrap the head in it; place another around the neck; put hot bottles, bags, or flat-irons to the feet, or give a hot foot bath. Remember that if the patient is unconscious, he can not feel, and so may be burned if the applications are too hot. No hot-water bag should be above 125° F. Give a hot enema if necessary.

If the face is very pale and the pulse feeble, apply hot cloths or fomentations over the heart for a few minutes, followed by cold applications. (See Nos. 170, 186.) If the breathing is very difficult, turn the patient on his side, still elevating the head and shoulders. No food should be given for a day or two, and then in very small quantities. After the second day, light gruels or a milk diet may be given. All stimulants must be carefully avoided, such as digitalis, strychnin, alcohol, coffee, and tea. Continue the cold to the head three or four times a day, and move the bowels with the enema or a mild cathartic. It may be necessary to draw the urine with a catheter.

After the stiffness of the muscles of the first few days has disappeared, the patient should have tonic treatment,

wet hand rubs at first, followed in a few days by cold friction, and the wet towel rub. Massage the affected side daily, and give galvanism three times a week. (See Nos. 184, 190, 200.) If the paralysis remains more than three or four months, with contractures, there is not very much that can be done for the patient.

CHOREA

Synonyms.— St. Vitus' dance, Sydenham's chorea.

This is a functional nervous disorder, characterized by irregular involuntary movements of the muscles. It most frequently affects children.

Causes.— It is most common between five and fifteen years of age, in girls of nervous temperament. Spring seems to be the most favorable time of year for its development. Heredity is important; a history of alcoholism in father or mother; great fright or emotion; shock, worry, strain; acute rheumatism is the cause of twenty per cent of all cases; scarlet fever, worms, eye strain; reflex irritation, from the intestines or genital organs; heart-disease. Chorea is not so common in the negro race.

Symptoms.—There are three types,—the mild, the severe, and the violent. The first symptoms are restlessness and awkwardness, twitching in arms and hands, very slight at first, also about the mouth, face, and head on one side at first. The movements increase; the child can not sit still; he shuffles the feet; walking may become difficult. The disease may involve the entire body, but most commonly is confined to certain groups of muscles. When the facial muscles are involved, grotesque grimaces are produced. The muscles are weak; eating and speech are difficult. The movements subside during sleep, and are increased by calling attention to them.

The child may be very emotional and irritable, with outbreaks of temper. The memory is poor, and mental con-

centration is difficult. The heart is frequently diseased. Fever is present in the violent type. The average duration is from eight to ten weeks. Some cases resist treatment for months. The tendency to recur is common. Recovery is the rule.

Treatment.— Attention to hygienic measures is of the greatest importance. The home life should be a pleasant one, free from domestic storms, scolding, and faultfinding. All excitement, mental and physical, should be avoided. Any reflex irritation, such as worms, eye strain, and genital irritation, should be corrected. Rest, with long periods of sleep, in well-ventilated rooms, should be encouraged. If the movements are very severe or violent, the patient should be confined to the bed. Not sufficient importance is attached to rest.

The child should be taken out of school, and if able to do so should be encouraged to spend certain hours in the sunshine and fresh air. During the time when the movements are most marked, other children and friends should be excluded, to avoid excitement, and to insure as perfect quiet and rest as possible.

Constipation is common in chorea, and should be attended to. It is best regulated by a dry diet and fruit, with free water drinking at bedtime and before breakfast. All stimulating and irritating food should be withheld, and the child given a simple, wholesome, nutritious fare. No meat should be allowed.

Hydrotherapy.— On rising in the morning cold sponging of arms, back, and legs, with friction, is good. (See Nos. 179, 184.) As soon as the patient becomes accustomed to the cool water, give general friction. The neutral bath maintained at a temperature of 95° for thirty minutes is a most efficient measure in reducing the movements and in producing sleep. If the neutral bath is not possible, give the neutral pack (even the wet sheet pack is soothing), also

large, moderately hot fomentations to the spine. Neutral sprays are of great service if convenient to give. (See Nos. 174, 175, 185, 170.) As the patient becomes stronger, other measures may be employed, such as the wet sheet pack and the cold towel rub.

Static electricity may be used through the entire disease, and massage in the later stages.

Chronic Chorea.— This was described by Huntington, of Pomeroy, Ohio, and often bears his name. It appears late in life, is associated with mental disturbances, and is due to hereditary influences. It begins in the hands, interfering with writing, and later with walking; speech is slow and difficult, and finally lost. The patient becomes demented.

INFANTILE CONVULSIONS

Synonyms.— Eclampsia, fits.

Causes.— Poor digestion, overloading the stomach, disturbances arising from the stomach and bowels, slow teething, with irritation, worms, rickets, fever, whooping-cough, irritation of the genital organs, and congestion of the brain. Paralysis may follow a severe convulsion.

Symptoms.— Sudden onset, begins in the hands, the eyes are fixed and staring, or may be turned upward, the child straightens out and becomes stiff, breathing seems to be stopped. From this the child begins to have a convulsion, contortions, rolling of the eyes, and a drawing back of the head. If the attack follows indigestion, there is only one convulsion, of a few minutes' duration, and it is followed by sleep. Several attacks in succession are dangerous, and the child may never awaken; however, it is reassuring to know that death seldom results from the convulsion unless the child is very weak. The attacks in rickets are more severe and more dangerous.

Treatment.— During the attack put the child at once

into a full bath at 96°, or in a full warm pack with ice compresses to the head, or in a cold wet sheet pack with a towel wrung out of ice-water wrapped around the head. Keep the towel cold. (See Nos. 173, 175, 185, 186.) Remove all irritation if possible. Produce vomiting by the finger in the throat, and give a hot enema. (See No. 195.) If the gums are hot and swollen, give cold water, and rub them with a cloth that has been held on ice. After the convulsions have passed off, and the child sleeps, let him remain in the pack an hour, keeping the head cool and the feet warm. Avoid medicines and soothing sirups.

WRITERS' CRAMP

SYMPTOMS.— Tired feeling in the muscles of the arm, weakness, spasm of the muscles when an effort is made to write. Some tremor is present.

TREATMENT.— Avoid the cause; give hot and cold applications to the arm, massage, manual movements, faradic electricity, outdoor exercise; rest from confining work.

EPILEPSY

SYNONYM.— Falling sickness.

CAUSES.— Heredity has a marked influence. Children of alcoholic parents are frequent victims of the disease. Children who are subject to convulsions are predisposed to epilepsy in later years. Epilepsy usually begins some time during the first decade, or just before puberty, and on to twenty-five. It may follow a blow on the head, or injury, great exhaustion, self-abuse, and the early use of alcoholic drinks. It occurs in individuals who are weak-minded and have a tendency to insanity. Epilepsy is sometimes due to reflex irritation, such as stomach troubles, worms, irritation of the ear, eye strain, or an adherent prepuce.

Epilepsy is a disease that is increasing at an alarming rate, and is an index to the almost universal physical transgression of nature's laws. The parents sow, and the child reaps.

Symptoms.— In the form called *grand mal* the attack may be preceded by peculiar sensations, called an aura, which may begin in a finger, a hand, in the stomach, or in the throat. The gastric sensations are most common. When the attack comes on, the patient gives a scream or yell, and drops as if knocked down by a blow. He is unconscious. The head is drawn back, the jaw is set, the limbs are extended, and the thumbs are clasped by the fingers. In a few seconds the patient relaxes; he begins to shake violently for a minute or more; the face is blue, froth flows from the mouth, and possibly blood, due to biting the tongue or lips. After the convulsion, or fit, the patient breathes heavily, and sinks into a deep sleep, which may continue several hours, or he may be aroused. After coming out of one of these seizures, the patient feels dull, very weak, and exhausted with headache. The attacks may vary from several in a day to one in several months.

In another form of epilepsy, called *petit mal,* the patient has an attack without convulsions. The attack comes on suddenly, without warning; there is a momentary unconsciousness, without an outcry or falling. The attack may come on while talking; it passes, and the conversation continues. In some cases the patient seems to be dazed, and may begin to undress himself. The attacks vary from a number in twenty-four hours to one in a year. This type is considered a forerunner of the convulsive form.

Prognosis.— Death rarely occurs during a fit. Cure is rare. Arrest of the disease is only temporary.

Treatment.— *Dietetic.*— In epilepsy the most careful attention should be given to diet. The condition of the patient is influenced more by what he eats and how he eats

than by any other one thing. Careful observation in many state institutions shows that epileptics are more free from seizures, and there are fewer of them, when meat, tea, coffee, and alcohol are absolutely denied the patient. The diet should be light and nutritious, consisting largely of fruits and well-prepared cereals or dextrinized grains, legumes, and milk. Food should be eaten slowly, thoroughly masticated, and care should be exercised not to overload the stomach. The patient should not go to bed with a full stomach.

General.— The patient should be surrounded by wholesome influences and dealt with kindly but firmly. Some useful occupation will keep the mind employed, and be of decided benefit. Prolonged mental effort should be avoided. Abundance of sleep is important.

Every effort should be put forth to improve the general health by outdoor work, exercise, and tonic baths, cold friction, electricity, and massage.

Epileptics should not marry. At times the patient becomes so violent that confinement in an asylum is necessary.

The Attack.— When the aura begins in the hand, the attack may sometimes be prevented by tying a string tightly around the finger, by clasping a stick firmly, by placing the hands in ice-water, or by pulling on the clasped hands. During the convulsion, biting of the tongue or lips may be prevented by inserting a piece of cork or a handkerchief between the teeth. Fomentations to the spine and stomach may prevent repeated attacks. The hot blanket pack is also another useful measure; continue for one hour and follow with cold friction. (See Nos. 170, 175, 184.)

Drugs are unsatisfactory in the treatment of epilepsy. When a patient is exhausted by repeated convulsions one after another, he may be quieted by placing him in a neutral sheet pack, continuing the treatment for one or two hours.

The skin, kidneys, and bowels should be maintained in as healthy a condition as possible.

NEURASTHENIA

Synonyms.— Nervous prostration, nervous exhaustion.

In this disease there is an exhausted or weakened state of the nerve-centers in the brain, spinal cord, and in the sympathetic system. Dr. Osler, in speaking of this condition, says that it is in some respects the physical counterpart of insanity.

Causes.— In speaking of hereditary influences, Dr. Osler says: "We do not all start in life with the same amount of nerve capital. Parents who have been the subjects of nervous complaints, or of mental troubles, transmit to their children an organization which is defective in what, for want of a better term, we must call 'nerve force.' Such individuals start handicapped, and furnish a considerable proportion of our neurasthenic patients. So long as they are content to transact a moderate business with their life capital, all may go well; but there is no reserve, and in the emergencies which constantly arise in the exigencies of modern life, these small capitalists go under, and come to us bankrupt."

Modern life, with all its nerve-exhausting tendencies, is producing its rapid and sure results. There can be but one conclusion; namely, physical bankruptcy. Any extra draught upon the vital forces, continued day after day without a corresponding restoration of the exhausted stores, must, according to eternal principles, leave one a wreck stranded on the barren shores of disease.

A feeble organization; anxiety over business cares; intense nervous strain attending the gaining or losing of large sums of money; worry over little things, the arbitrary demands of society, late suppers, sleepless nights, dyspepsia, auto-intoxication; overeating, excessive use of meat, tea, coffee; beer, wine, and drugs; over-sexual indulgence, love affairs, unhappy marriages, family trials, over-mental effort,

neglect of exercise, the convictions of a troubled conscience, and doubts,— all are factors in shattering the nervous system.

Symptoms.— *Cerebral Neurasthenia.*— Mental work is difficult, and mental concentration is almost impossible. Work that was once a pleasure and quickly done now becomes a source of irritation, and requires prolonged effort. Mental depression, worry, despondency; fatigue, mental and physical; irritability, headache, feeling of fulness in the head, sleeplessness, disturbing dreams, pain in the head, tenderness at times, hot and cold flashes, dizziness, disturbances of vision, aching in the eyeballs, and hysterical manifestations; cold extremities and palpitation of the heart.

Spinal Neurasthenia.—With many of the foregoing symptoms there are pains in the back with special centers of tenderness on pressure, spinal irritation, weakness and pains in the legs, great fatigue on slight exertion, hot and cold sensations, with perspiration, often of a clammy nature, chilly, creepy feelings, cold feet, and often palpitation of the heart, with throbbing of the stomach, due to the pulsations of the large artery behind it.

Gastro-Intestinal Neurasthenia.— All the symptoms of nervous dyspepsia, with coated tongue, constipation, and many of the symptoms enumerated under Spinal Neurasthenia. The hydrochloric acid is often increased. The stomach may be dilated and the kidneys prolapsed. There is loss in weight.

Cardiac Neurasthenia.— Palpitation of the heart, pain in the region of the heart, feeling of oppression, dizziness, faintness, throbbing of the arteries, hot flashes, sudden sweating, especially during sleep, cold hands and feet.

Sexual Neurasthenia.— Despondency, fatigue, loss in weight, weakness of the sexual organs, nocturnal emissions, spermatorrhea, pain in the testicles, impatience, depression. The mental state is marked. Among such, quacks flourish.

In women there may be painful ovaries, and many of the symptoms named above.

In many neurasthenics the blood is impoverished, the patient loses weight, and is greatly disturbed by the least variation in his weight. The urine may be scant and contain uric acid. Nearly all neurasthenics are markedly influenced by climatic changes, being depressed by rain, cloudiness, and damp weather. Such patients are subject to physiological storms. One day they are in high spirits and the next in the slough of despair. Many feel more depressed in the morning.

Prognosis.— All can get well who are determined to rise above their physical infirmities. Allbutt says: "The patient who can lift his eyes to the future will recover; he whose thoughts live in the past is on the broad road to lunacy."

Treatment.— Neurasthenia is a disease that requires the most careful consideration, and each individual case needs to be studied by itself. Such patients can not be greatly benefited by home treatment, but should seek an institution where every detail of their case can be given attention, and every available therapeutic measure can be brought to bear upon it.

Neurasthenics who are anemic and below the normal weight need to go on the rest cure, and eat four or five light meals a day, consisting of eggs, cereals, butter, toast, abundance of cream, fresh fruits, peas, and bean purée. They should have fomentations to the spine and liver ten minutes twice a day, followed by cold friction, light massage daily, and electricity three times a week. (See Nos. 170, 184, 200.) Those tired from long mental strain require an outdoor life and much exercise.

For headaches and constipation see directions given under those headings.

In general, neurasthenics should avoid introspection as much as possible, seek the sunshine, become friends of nature, know and keep within bounds of personal limitations, try to

get out of self, and open the heart to God. This is exactly what many nervous individuals need.

The one important factor in the treatment of neurasthenia is the mental attitude of the patient toward himself, his fellows, and his relations to his Maker. The mind that recognizes its own weakness, and so turns to a higher power, to the divine Source of strength, and relies upon this, and co-operates with rational agencies, will certainly be able to place itself above the depressing influences of this disease. A hopeful disposition must be cultivated and maintained. He who would get well must look up and not down, out and not in.

No neurasthenic can hope to make progress while persisting in the use of tea, coffee, alcohol, or, in fact, any habit that is the means of exhausting his nerve-centers.

HYSTERIA

Hysteria is a diseased state in which there is a lack of self-control, and the mind is influenced by small things. It is a functional nervous disease, and is manifested in many ways.

Causes.— Most common in women, beginning at puberty. May occur in men, or even in boys. An inherited weak, nervous organization is a marked factor. Highly sensitive nervous temperaments are most subject to the manifestation of hysteria. It is common among girls who are petted and sympathized with for every trifle. Overstudy during the second decade of life, overindulgence, the gratification of every whim, love affairs, grief, worry, and sickness are all important causes. Diseases of the ovaries and uterus sometimes seem to make it prominent. Hysteria is most common in France, but occurs only too frequently among the English-speaking peoples.

Symptoms.— Hysterics, weeping, laughing, great excite-

ment, falling over, usually in a soft place, convulsions, throwing of the arms, stiffening of the body, resting on the head and heels, feeling of oppression, the sensation of a ball rising in the throat, headache, dizziness, belching of wind. Hysterical patients can simulate almost any disease.

The spine is tender to pressure, also the scalp, also under the eyes, under the breast, and over the ovary, usually on the left side. Some areas of the skin are numb, and lose the sensibility to heat or cold; then again the skin is oversensitive, and there may be a feeling as if a nail were being driven into the head.

There may be paralysis, contraction of muscles, tremors, swelling of joints, disturbances of taste and vision, sensitiveness to light, impaired hearing, with ringing in the ears, loss of voice, difficult swallowing, pain in the stomach, depraved appetite, constipation.

The mental attitude of the hysterical patient is peculiar. To obtain sympathy he will deceive relatives, friends, and even physicians for years. Every device is practised in order to get physicians to make examinations and spend time with the patient.

There is not a long step between hysteria and insanity. Hysterical patients may display many manifestations of insanity, and even become insane. Often the patient shows a marked moral depravity.

Treatment.— Dr. H. C. Wood says, "The basis of the hysterical character is selfishness." Hence the treatment of hysteria is educational and moral rather than therapeutic. A child should be educated to self-control, to deny itself, to cultivate love for others, to occupy the mind with wholesome thoughts and doing for others rather than to be served. Proper studies, outdoor work, and exercise are necessary. A child should be taught obedience not only to others but to its own personality. Patience and self-control under provocation must be maintained. Strength of character is

estimated by the feelings we subdue rather than by the feelings that subdue us.

A hysterical mother is not a proper person to exercise control over her daughter. The home environment should be sweet and conducive to the development of a strong character.

In treating a hysterical patient, it is well not to call attention to symptoms any more than is necessary, for this simply fixes the attention upon them. A symptom that is not in evidence, will, if asked for, soon appear; hence the attention must be entirely distracted.

Such patients are best treated in a well-equipped sanitarium, where they can be educated into a wholesome state of mind and body. It is among this class of patients that Christian science flourishes.



CHAPTER XXX

Drug Poisoning and Parasites

ALCOHOLISM

Acute.— A large amount of alcoholic drinks will produce all the symptoms of acute poisoning. When thoroughly under the influence of liquor, the patient is drowsy and prefers to sleep. He can be aroused and will reply to questions.

TREATMENT.— Wash out the stomach. Give the patient a cold spray or a cold plunge bath, and at the same time rub him vigorously. This will frequently sober a man.

Chronic.— A diseased state caused by the continued use of alcoholic drinks.

TREATMENT.— No man can, of his own will-power, give up the use of alcohol and ever after be safe from its charm. No man can give up the use of liquor, and continue to smoke or chew tobacco. He may stop for a time, but he will certainly fall again. The only remedy against the intoxicating cup is a change of heart and body, with careful attention to diet, and avoiding temptations. All other remedies are delusions and snares, and many there are who are snared thereby. When the alcohol habit is once fully formed, it is rarely abandoned.

The patient should be placed in an institution with authority to have full control over him, subject to the directions of a physician, and under the constant care of a nurse night and day. All alcohol must be denied him.

The diet should consist of koumiss or buttermilk and malted nuts, with a few changes as the patient obtains more self-control. Meat produces a thirst for alcoholic drinks. After the first ten days or two weeks, the diet should consist largely of fruits, vegetables, nuts, and dextrinized cereals, toast, cream, eggs, peas, purée, etc. All stimulants must ever after be avoided.

During the first few days after the alcohol has been withdrawn, the patient should be given the neutral galvanic bath several times during the twenty-four hours, and eliminative treatment, with hot and cold over the heart, fomentations to the spine, and the hot enema. Later the treatment should be more tonic in nature, but graduated to the condition of the patient,— the cool wet hand rub for a few days, then the cold friction, beginning at 75°, and later the wet sheet pack, salt glows, sprays, and static and faradic electricity. (See Nos. 174, 189, 170, 195, 184, 185, 190.)

A habit that has long been persisted in is not overcome in a day or a month. Constant watchfulness is necessary, for the temptation comes at the most unexpected times. Prayer, with a realization of one's besetting sin, will give the victory.

MORPHIN HABIT

This habit is the result of the continued use of opium and its alkaloid, morphin. In this country the habit is usually acquired through the use of the drug to relieve pain of some nature. Opium is a drug that creates a desire for itself, and increasing doses are always necessary to produce the desired effect.

Physicians are frequently responsible for the morphin

habit, because of the free way in which the drug is dispensed. Thousands of physicians in this country are themselves victims of this habit, which holds them like bands of steel.

Symptoms.— Moral degradation, deceitfulness, loss of sensibility, selfishness, irritability, lassitude, tremor, loss of appetite, sweats, chills, sallowness of the skin.

Treatment.— As soon as possible place the patient in an institution, under the constant care of a trained nurse. Completely withdraw the drug within three or four days, at once in many cases. During this period every possible deception will be practised by the patient to obtain the drug. The diet should consist of koumiss, malted nuts or malted milk, skimmed milk or buttermilk, fruit juices, white of egg, and other light and easily digested foods.

The nerves that have been quieted with opium now tingle with pain, and the patient is in the greatest agony. Great care must be exercised, or self-destruction may be attempted. During this state nothing is better than the prolonged neutral bath (see No. 174), or the galvanic neutral bath, given frequently during the first few days. If this is not possible, the hot blanket pack may be given, or the wet sheet pack prolonged into the neutral stage, and continued for thirty to sixty minutes if possible. (See Nos. 175, 185.) If heart failure is imminent, alternate hot and cold compresses over the heart will act as a tonic. This treatment may be repeated frequently if necessary. (See No. 189.)

In the course of ten days or two weeks the patient is almost normal again. Tonic treatment is now indicated. This should consist of fomentations to the spine and liver, hot and cold sponging of the spine, hot and cold sprays of short duration, saline sponging, cold mitten friction (mildly given), two or three times a day, and, as the patient is able to endure them, more vigorous measures. (See Nos. 170, 189, 184, 180.)

A morphin patient will always need to give careful atten-

tion to his diet and habits of life; for a return to former habits and associates means a return, sooner or later, to the use of the drug. But none who have become addicted to the use of morphin need despair; for care in diet, avoiding tea, coffee, meat, and alcohol, which produce a craving for the drug, together with a firm hold upon God, will keep one from falling again into this terrible bondage.

HEAT EXHAUSTION AND SUNSTROKE

Causes.— Exposure to intense heat, high moist heat, a hot, moist atmosphere, exposure to the direct rays of the sun. Intemperance is a marked predisposing factor. Alcoholic drinks are taken on a hot day to "cool the body;" one drink causes more thirst; more drinks are taken, and the brain is intensely congested. Drinking large quantities of iced drinks on a very hot day, especially after a full meal, may sometimes be a cause of heat stroke.

HEAT EXHAUSTION

Symptoms.— Prostration, collapse, restlessness, weak but rapid pulse; surface of the body is cool, and the temperature may be subnormal. This condition follows long exposure in overheated rooms in the summer, or it may follow over-exposure to artificial heat, as in factories, foundries, etc. Death is not common.

Treatment.— Rest in bed, full hot bath, hot blanket pack, hot and cold sponging of the spine, hot and cold compresses over the heart. The patient must be kept warm, and receive stimulative treatment, such as the hot blanket pack for five minutes, followed by cold mitten friction and friction to the extremities. During all hot treatment, cold compresses should be applied to the head and neck. Give hot coffee to drink. (See Nos. 173, 175, 179, 189, 184, 186.)

SUNSTROKE

Symptoms.— Dizziness, faintness, headache, oppression in the head, nausea, vomiting, hot head and skin, with a very high temperature, 106° to 112°. The patient becomes unconscious, breathing is labored, and the pupils of the eyes are contracted. A recovery of consciousness and a fall of temperature are considered favorable signs. Death may be sudden, due to heart failure, or to intense congestion of the brain.

Treatment.— Rest, ice to the head, neck, and spine. The ice may be pounded up, placed in a cloth bag, and applied, or ice-bags may be used. (See No. 199.) Cold wet towels, cold water poured over the patient, or the wet sheet pack, water at 50° or 45°, repeated every four hours (see No. 185), cold sponging, and even rubbing the body with ice-water, will help to reduce the temperature. Place the ice-bag over the heart every three or four hours, for twenty minutes at a time. The graduated bath is an effective treatment, and should be given if possible. Use the thermometer in the rectum frequently to determine the temperature.

If there are convulsions, give a few inhalations of chloroform from a handkerchief or bit of absorbent cotton which has been dampened with the drug. Later, give the patient tonic treatment. The diet should be light. In many cases it is necessary ever after to avoid exposure to heat, as a high temperature tends to cause a return of the symptom.

LEAD POISONING

Causes.— This disease occurs among painters, plumbers, typesetters, and lead workers; drinking water is sometimes a cause, as are also cosmetics.

Symptoms.— Colicky pains in the abdomen about the navel, constipation, blue line on the gums at the border of

the teeth, exhaustion, weakness, fatigue on exertion, wrist-drop due to weakness of the arm muscles, tremors, swelling of the feet, face, or hands.

Treatment.— Avoid the cause. Painters and lead workers should use extra pains to keep the finger-nails, hands, and skin clean. Take potassium iodid, ten grains, three times a day in a little milk; for a week or ten days, a large dose of salts before breakfast, one or two tablespoonfuls. Electricity is necessary for the nerves and muscles.

ARSENICAL POISONING

Symptoms.— Intense pain in the esophagus, stomach, and intestine, violent vomiting, and purging. This may continue for two or three days with a remission, and then all the symptoms return. Death occurs usually from the fourth to the sixth day. An eruption frequently appears about the third day, and, later, inflammation of the nerves.

Treatment.— Wash out the stomach and bowels; give large draughts of water to flush the kidneys; apply fomentations over the stomach and bowels to relieve the pain, and give the chemical antidote, hydrated peroxid of iron with magnesia. (See No. 170.)

CARBOLIC-ACID POISONING

This is one of the most deadly and quickest acting poisons known.

Symptoms.— White scars on the lips, gums, tongue, and throat, intense pain, vomiting, purging, sweating, pinched face, collapse, weak, rapid pulse, and the smell of carbolic acid. If much of the drug is taken, the patient may die within a few minutes. The urine is dark and smoky.

Treatment.— Large doses of salts, sodium, or magnesium sulphate, one or two tablespoonfuls in half a glass

of water, and washing out the stomach with a weak solution of sodium sulphate. Give white of eggs, thin starch gruel, flaxseed, oatmeal gruel, fomentations to the entire abdomen, hot and cold compresses to the spine, cold friction, heat to the feet and legs, and other sustaining treatment. (See Nos. 170, 189, 186, 184.)

Carbolic acid on the skin is neutralized by applying alcohol. Pour on, or apply with absorbent cotton. Do not rub.

PTOMAIN POISONING

This may be caused by eating sausage, oysters, salmon, pork, decayed meat, shell-fish, or even spoiled milk.

Treatment.— Wash out the stomach, or produce vomiting by drinking several cups of lukewarm salt water, or by tickling the throat with the finger. Give large hot enemas, with fomentations to the abdomen and spine, keeping the feet warm. (See Nos. 195, 170.)

ANIMAL PARASITES

Round Worms, Ascaris Lumbricoides.— These parasites vary from six to twelve inches in length, and any number from two to several hundred may be present. They may pass into the stomach, or crawl up the bile passages into the liver.

Symptoms.— These are indefinite. Picking at the nose, grinding the teeth when asleep, restlessness, irritability, twitching of the muscles, convulsions, are indications; but the passing of a worm or fragments of a worm is the only sure symptom.

Treatment.— After the child has fasted for twelve hours, give, next morning, one and one-half grains of santonin and in three or four hours a large dose of castor-oil. Santonin simply stupefies the worm; castor-oil sweeps it out of the

intestine. Follow by a large warm enema. (See No. 195.)

Pinworms.— These worms are small; they are called seat-worms, or threadworms. This parasite is found in the rectum and colon. It produces intense itching and irritation, and in girls frequently leads to bad habits.

Treatment.— Give large cleansing enemas. Steep one ounce of quassia chips in a pint of water, and inject into the bowel, with the patient in the knee-chest position, or with the hips well elevated. To inject a weak salt solution is also very effective. The injections should be continued daily for from ten days to two weeks. The salt enema, two tablespoonfuls to the quart, gives immediate relief.

TAPEWORM

The pork-tapeworm, the *Tænia solium,* is from six to twelve feet long, and is made up of a large number of segments. Each segment contains the male and the female generative organs, and so is able to propagate itself. About the four hundred fiftieth segment becomes ripe, and contains ova that may produce other worms.

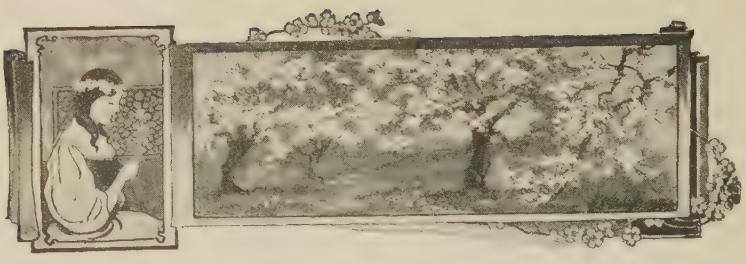
The beef-tapeworm, the *Tænia mediocanellata,* varies from fifteen to twenty feet in length, and has a larger head than the pork-tapeworm. It is by far the most common tapeworm in America.

The ova of these ripe segments contain the embryo tapeworm. Before it can develop, it must pass into the stomach of an animal or of man. There the little capsule that surrounds the ovum is digested off, and the embryo becomes free. From the stomach the embryo passes into the flesh, and develops into a larva. In a hog these larvæ produce the so-called measly pork. When this flesh is eaten by man, he becomes the host of a tapeworm.

Symptoms.— The only positive symptom of tapeworm is the finding of joints in the stools. The other symptoms are

indefinite, such as increased appetite, colicky pains, loss of flesh, anemia, and depression.

Treatment.— Take two tablespoonfuls of castor-oil or a like dose of salts, then fast for twenty-four hours. Eat nothing but light fruits or fruit juices. The best and most effective drug is pelletierin, the active principle of pomegranate, in from three- to six-grain doses, dissolved in one ounce of water. Take this in the morning, then lie down and be quiet. Vomiting should be prevented if possible at least for half an hour to one hour, by firm pressure over the stomach. At the end of one hour take two ounces, or four tablespoonfuls, of castor-oil. In the course of three or four hours take a large enema with the hips elevated. (See No. 195.) The worm should always be examined for the head. If this is not present, the treatment must be repeated. Two ounces of pumpkin seeds crushed in a mortar and flavored with honey may be taken in the place of pelletierin.



CHAPTER XXXI

Diseases of the Eye

CONJUNCTIVITIS

This is an inflammation of the conjunctiva covering the eyeball and also the inner surface of the eyelid. There are several forms of conjunctivitis; namely, catarrhal, purulent, gonorrheal, diphtheritic, granular, and phlyctenular. This is an arbitrary classification, for one form may run into other forms. The so-called "pink-eye" is simply an epidemic of catarrhal conjunctivitis.

1. *Catarrhal Conjunctivitis.*— Caused by injuries, exposure, overuse of eyes, bad hygiene, eruptive diseases, colds.

Symptoms.— Burning, smarting, itching, flow of tears, feeling of sand in the eye, congestion of the eye (bloodshot), gathering of a little muco-purulent matter in the eye, and a tendency of the eyelids to stick together. Light is painful.

Treatment.— Cleanse the eye every two hours with boric-acid solution, fifteen grains to the ounce of water. Use an eye-dropper, or squeeze the fluid from a piece of absorbent cotton. Apply cold compresses to the eyes, changing every minute for half an hour at a time, at the same time applying hot compresses to the forehead. This will relieve the

congestion of the eye. In place of the cold compresses, cracked ice in a folded towel or an ice-bag may be held against the closed eye. This will greatly relieve the inflammation. Apply hot compresses to the eyes for ten minutes every two hours. If the pain is very intense, use a solution of ten grains of boric acid and four grains of cocain in an ounce of water, placing a few drops in the eye every two hours.

The patient should use his own soap, wash basin, towel, etc., in order to prevent the infection of others.

2. *Purulent Conjunctivitis.*— The symptoms and treatment are the same as the preceding. In this form more pus is present, hence greater possibility of ulceration of the cornea. In addition to the treatment suggested for Catarrhal Conjunctivitis, the eyes should be carefully protected, and washed out twice a day with a silver-nitrate solution, ten grains to the ounce of water, immediately following it with a weak salt solution (a teaspoonful in a pint of warm water). Or place one drop of a ten-per-cent solution of argyrol in each eye three times a day. If only one eye is involved, the other eye should be protected by placing over it cotton or gauze, held in place by adhesive strips. Great care must be exercised on the part of the attendant to disinfect the hands and avoid touching or rubbing the eyes.

3. *Granular Conjunctivitis.*—Synonyms.—Granular eyelids, trachoma. This condition follows the other forms. If the eyelid is turned over, the surface looks dull, and is covered with irregular, rounded, yellowish little masses, which look like sago grains. These are sometimes called "frog-spawn" granulations.

Symptoms.— The eyelids stick together; mucus and pus collect in the inner corner of the eye at night, and the eyelashes are matted in the morning, at times making it difficult to open the eyes. There is itching, burning, fear of light, pain, and flow of tears. The tendency of the disease

is to be chronic. It may deform the eyelid, making it contract and turn in, causing the eyelashes to rub against the cornea. This condition is called trichiasis, and in time may interfere with the vision.

Treatment.— This disease is highly contagious, hence the greatest care must be exercised; especially should the patient have his own towels for his exclusive use.

Apply hot and cold compresses to the eye, hot and cold sprays, and cleanse the eye frequently with a saturated boric-acid solution. Touch the eyelids with a swab saturated with a ten-grain solution of silver nitrate (ten grains to the ounce), and follow by a weak solution of common salt. This should be a daily treatment. Use the argyrol solution mentioned on the preceding page twice a day.

After the acute inflammation has subsided, a few drops of one dram of tannin in one ounce of glycerin may be dropped into the eye daily. In chronic granular conjunctivitis, yellow oxid of mercury, two grains to the ounce of vaselin, may be placed under the eyelid in small quantities.

FOREIGN BODIES AND INJURIES OF THE EYE

Sand, cinders, glass, and other foreign bodies may be washed out of the eye by using a stream of lukewarm water. The sensation of a foreign body may remain after it has been removed.

How to Turn the Eyelid Back.— Have the patient stand or sit facing the light. Take a toothpick, match, or small pencil, place the end firmly across the upper eyelid, at about the middle of the lid. With the fingers take hold of the eyelashes gently, pulling downward and then upward, turning the eyelid up over the instrument held against the lid. A little practise will enable one to do this very quickly. Holding the everted eyelid with one hand and drawing the lower eyelid down with the other, have the patient roll the

eyeball in all directions. Any foreign particle can be easily seen. Remove with a soft, clean handkerchief.

To drop medicine into the eye, use an eye-dropper. Let the head rest on the back of a chair, pull the lower lid down by drawing on the skin, and drop the medicine near the inner angle. Close the lids and have the patient roll the eye about.

Injuries from lime, mortar, acids, alkalies, and hot fluids cause sloughing, and a scar is formed in healing. Wash the eye at once with warm water, and then use olive-oil freely. Lime or lye can be neutralized by washing the eye with a solution of vinegar and water, one teaspoonful of vinegar to two tablespoonfuls of water. Acids can be neutralized by a solution of soda, one teaspoonful to an ounce of water. If the pain is intense, four grains of cocain to an ounce of water or olive-oil will allay it. With this treatment apply cold compresses to the eye, alternating with fomentations. A blow on the eye should be immediately followed by cold compresses if possible, and later by fomentations. (See Nos. 186, 170.)

In all other diseases of the eye very little can be done by home treatment. The patient should seek a skilled oculist.

STY

A sty, or hordeolum, is a boil affecting the connective tissue of the edge of the eyelid. It is tender to the touch, and redness and swelling are present. Pain is intense. Several sties may appear at once or in succession. A small abscess forms and points at the edge of the eyelid.

The frequent appearance of sties indicates weak eyes or some error in refraction.

Treatment.—Cold compresses are indicated at first, later very hot continuous fomentations. As soon as pus appears, the tumor should be held firmly between the thumb and forefinger, and opened with a knife, cutting parallel with the edge of the eyelid.



CHAPTER XXXII

Diseases of the Ear

The Ear Douche.— Requisites.— Fountain syringe, rubber tubes, and a small rubber or glass tube with rounded edges. Water from 100° to 110°. Use but little pressure. A tray or bowl should be held by the patient firmly against the cheek and neck below the ear. In place of this, oilcloth or several thicknesses of paper may be used to carry away the water. The operator should pull the ear upward and backward to straighten the canal, hence the stream of water is directed forward and downward. An ear syringe holding from two to six ounces may be used.

Cautions.— Be gentle and careful. Avoid too much pressure. If the water is hot, see that your patient does not faint away. If the patient becomes faint, tip him back at once in a chair, so that the head is lowered.

Indications.— The ear douche may be used: (1) in acute inflammation; (2) to remove hardened wax; (3) to remove insects and foreign bodies; (4) in eczema of the ear.

INSECTS AND FOREIGN BODIES

These consist of flies, ants, larva, bugs, peas, beans, beads, buttons, glass, and dirt. In removing insects, often all that

is necessary is a simple douche of warm water. To this may be added a teaspoonful of salt to the pint of water, or a teaspoonful of carbolic acid to the pint of water. No attempt should be made to remove from the ear any foreign body that can not be seen.

Peas and beans swell after being in the ear for a few hours, and are then more difficult to remove. In such cases it is safest to consult an aurist without unnecessary delay.

WAX

Wax that is not removed by the action of the jaw collects in the inner end of the auditory canal. As the water in the secretion evaporates, a black mass is left, which hardens and dries.

Symptoms.— Defective hearing, deafness, sense of fulness, ringing in the ears, dizziness, and often severe pain. Deafness does not take place until the wax comes in contact with the ear-drum, and as this may occur suddenly, loss of hearing is sudden.

Treatment.— Soften the wax by dropping into the auditory canal a solution of soda, twenty grains to the ounce, or a little warm olive-oil. The head should be inclined to one side, and this fluid allowed to remain for at least half an hour.

This treatment should be repeated three or four times before douching out the canal. The ear douche should be given with an ear syringe, as more pressure can thus be applied. The water should be about 106°. It may be necessary to repeat the douche several times. Sometimes the wax is so hard that it is necessary to remove it through an otoscope with an ear-spoon. If any wax remains on the ear-drum, unpleasant symptoms will continue. Cotton should be placed in the ears for a few days to avoid shock from noise, and also cold drafts.

EARACHE

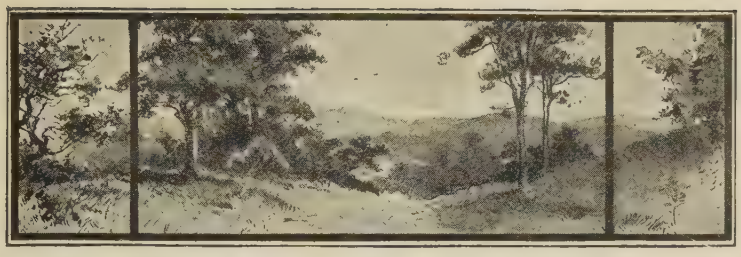
Earache, or *Otitis media,* is a symptom due usually to acute catarrh or acute inflammation of the middle ear.

Causes.— Exposure to cold and wet, sore throat, tonsillitis, following measles, scarlet fever, smallpox, diphtheria, typhoid fever, sniffing water up the nose. Violent blowing of the nose when the throat is sore may cause earache.

Symptoms.— Sensation of fulness, ringing in the ears, swelling, agonizing pain, fever. A very young child or an infant too young to locate pain, will strike toward the ear or take hold of the ear while crying. Pressure against the ear will increase the pain. Impaired hearing and deafness are usually present for a time. Spontaneous perforation of the ear-drum usually occurs, and is always followed by relief.

Treatment.— Large fomentations or heated bran or hop bags should be placed directly behind and over the ear, with cold or ice compresses around the neck. Continue the applications for two hours at a time if necessary. Give hot douches at a temperature of 108°. Dropping warm olive-oil or warm water, to which two or three drops of laudanum have been added, into the auditory canal, will sometimes give relief. Great care should be taken that the water is not so hot as to burn the little patient. Breathing into the ear, or softly blowing into it the vapor of chloroform from a bit of saturated cotton held near the ear, will give temporary relief, and cause the child to stop crying. Or drop into the canal a little of a solution of menthol, forty grains to an ounce of albolene, or liquid vaselin. Never put anything cold in the ear.

In chronic catarrh of the ears, special local treatment is often necessary. The general health should be built up by the daily morning plunge or sponge bath, with special attention to diet and outdoor exercise. Consult an aurist.



CHAPTER XXXIII

Diseases of Women

VULVITIS

Inflammation of the loose folds that cover the entrance to the vagina and the urethra.

Causes.— Irritating discharges from the uterus, want of cleanliness, accumulated discharges, scratching, masturbation, pus germs, gonorrheal germs, pregnancy, bicycle riding.

Symptoms.— Swelling, redness, burning or intense pain, itching, watery or purulent discharge, pain on passing urine, great restlessness.

Treatment.— Cleanliness; hot sitz baths two or three times a day; hot douches, containing one per cent of carbolic acid, a teaspoonful to a pint of water, well stirred, or a boric-acid douche, one teaspoonful to a pint of water, two or three times a day. Keep the labia separated with absorbent cotton dusted with subnitrate of bismuth. An ointment of oxid of zinc containing two per cent of menthol will, in many cases, afford relief. Rest is important in order to avoid further irritation. (See Nos. 172, 192.)

PRURITUS VULVA

Itching of the vulva.

Causes.— Eczema, sugar in the urine, rubbing of the

clothes, friction, enlarged veins, pregnancy, reflex irritation, irritating discharges.

Treatment.— Same as that given under Vulvitis. Use the ointment freely. In case it does not give relief, use zinc oxid ointment, with three per cent of carbolic acid and one dram of ichthyol.

PERINEUM LACERATION

Lacerations may vary in extent, from a slight tear to a complete laceration into the rectum and up to the uterus. The great cause of laceration of the perineum is childbirth.

Symptoms.— Uterus is slow in returning to its normal size, backache, dragging sensation, pain in the ovaries, feeling of loss of support; vagina may protrude if the patient strains or lifts; there is a sense of lassitude; constipation is common. Many nervous symptoms may develop. Displacement of the uterus is common.

If an extensive laceration is neglected for a long time, the bladder, because of the lack of support, presses down into the vagina and forms a cystocele, while the force required to empty the rectum causes it in time to be pushed forward into the vagina, forming a rectocele. This causes the uterus to assume abnormal positions.

Treatment.— The only successful treatment is operative. Hot and cold douches will give tone to the structures. The bowels should be regulated by the diet as much as possible.

MENOPAUSE, OR CHANGE OF LIFE

Synonyms.— Critical period, turn, climacteric.

This period of a woman's life is a variable one. The change may take place in a few months or cover a period of years. The menopause is most common between forty-five and fifty years of age. In some it occurs earlier and in others later.

In warm climates the change takes place earlier. It is said that women who begin to menstruate early are late in passing through the change of life. There is no way of forecasting when it will take place. In some there are few disturbing influences during the change of life, while other women suffer intensely and even become invalids for a time.

Symptoms.— Irregular menstruation or a sudden cessation of the menses. After the fortieth year if the periods are irregular, a little late, or skipping a month or more, there is quite good evidence that the change has begun. During the change of life there is a marked perversion of the nervous system. All women complain of flushes, hot and cold sensations, palpitation of the heart, faintness, loss of ambition, mental disturbances, such as loss of memory, lack of mental application, fears, depression, melancholia; some are very hysterical. Leucorrhea is common. Many women take on flesh at this period and become stout. Hair may appear upon the lip. In some the sexual desires are very much aroused at this period. Dyspepsia, indigestion, and constipation are common. The breasts flatten and shrink away.

Treatment.— Every possible effort should be put forth to maintain the vital resistance. Select the diet with care, and see that all the eliminative organs are in active condition. Outdoor exercise, swimming, walking, riding into the country, free water drinking, warm baths, and cold morning sponging with vigorous friction, are measures which will prevent local congestion, and tend to equalize the circulation. The mind should be free and not burdened with too weighty cares. The large majority of women pass through this period safely, and have good health afterward.

AMENORRHEA

There are three periods of a woman's life when she does not menstruate; namely, before puberty, during pregnancy,

and after the menopause. The absence of the menses during any other period is called amenorrhea.

Causes.— Overstudy in young girls, getting the feet wet, sitting on the damp ground or on a door-step, cold bathing during the menstrual period, traveling, fright, emotion, anger, grief, or acute fever, may cause it. Chlorosis and tuberculosis are frequent causes of amenorrhea. It may be caused by malaria, Bright's disease, heart-disease, or tumor.

Treatment.— When amenorrhea is due to some acute disease, it is nature's method of saving the patient from other exhausting influences, hence no haste should be made to induce menstruation. If the amenorrhea is due to pregnancy, no attempt should be made to bring on the periods.

Hydrotherapy is the most effective measure in re-establishing regular menstruation. The hot foot bath for half an hour, repeated three or four times a day at the expected time, is often all that is necessary. The hot hip pack, the hot pelvic pack, douche at 104°, using two or three gallons of water, fomentations to the lower spine and over the lower portion of the abdomen, will increase a healthy circulation in the pelvis and tend to establish menstruation. (See Nos. 171, 177, 192, 170.)

The bowels should be carefully regulated by a fruit and dry diet, together with the hot enema if necessary, especially at the expected period.

The absence of the periods in young women not due to pregnancy calls for more than local treatment. There are constitutional disturbances; thus the general health needs attention. Eat liberally, exercise, live an outdoor life, and avoid standing much on the feet.

DYSMENORRHEA — PAINFUL MENSTRUATION

Painful menstruation does not include the slight discomfort or indisposition that is experienced by many women. However, at times it is difficult to be able to draw exactly

the dividing line. Normal menstruation is painless. At the present day so many women suffer so keenly, and from the very beginning of menstruation, that they almost come to consider it the lot of woman.

Our present civilization has much to do with this difficulty. There can be no question that modern living, conventional dress, corset wearing, heavy skirts suspended about the waist, dragging down on the delicate organs of the abdomen, and the exacting demands of society, have much to do with the present condition of women.

Improper standing and sitting positions, together with lack of exercise, are prolific causes of the diseases peculiar to women. Crowding the uterus down by tight dresses, or a prolapsed stomach and bowels pressing upon the uterus, cause that organ to be displaced and bent upon itself either forward or backward, interfering with the menstrual flow.

The pain in dysmenorrhea is usually referred to the region just above the pelvis, or at the sides. In some, the pain is intense before the flow begins, and then disappears; in others the pain continues throughout the period. In some the pains extend down the limbs and up to the shoulder. Because of the character of the pains and the symptoms present, several types of dysmenorrhea have been recognized.

1. *Neuralgic.*— Causes.— Any condition that has a tendency to produce neuralgia in the body, such as retained wastes, defective elimination, loss of blood, anemia, rheumatism, gout, dilatation of the stomach, prolapsed stomach, or the excessive use of meat, tea, coffee, or alcohol.

Symptoms.— Intense pain, of a shooting nature, which is present before the flow begins, and often ceases when it begins. The skin over the lower part of the abdomen seems to be in a state of increased sensitiveness. This type of painful menstruation is very exhausting. I have known it to be so severe as to cause delirium. Headache is usually present.

Treatment.— The pain is best relieved by fomentations over the painful areas and to the spine. (See No. 170.) Before the flow begins, a hot sitz bath or a hot hip pack may be taken. (See Nos. 172, 177.) Either dry or moist heat gives great relief. An enema at 108° or a vaginal douche at 102° is soothing. (See Nos. 195, 192.) The patient should be quiet. If the pain is very severe and continuous, it will be relieved by ten grains of phenacetin. The severe pain is more exhausting than the drug. As a rule, this drug will not be necessary if the treatments are thoroughly given.

During the inter-menstrual periods the patient should see that there is a daily normal movement of the bowels, that the skin is kept active by one or two warm baths a week and a cold sponge every morning, and that the diet is carefully regulated.

2. *Congestive.*— In this type the pelvic organs are congested, and pain of a throbbing nature is present. The congestion is more intense where there are adhesions due to previous inflammation or frequent child-bearing. Tumors may cause it, or displacement of the uterus, usually backward.

Symptoms.— Scant flow, intense pain, marked headache, flushed face, hot, dry skin, feeling of fulness in the pelvis, much pain on walking even between periods, irritable bladder.

Treatment.— Rest, heat to the feet, cold to the head. If the uterus is displaced backward, have it replaced just before menstruation, and held in place by means of tampons. This will often give the sufferer much relief. The knee-chest position may be taken for fifteen minutes at a time. In this position the patient rests upon the knees and chest, with muscles relaxed, either on the bed or on the floor. A hot leg and hip pack, taken two or three times a day, often affords relief, as does also the hot leg bath. Short

fomentations over the lower part of the abdomen are often given with excellent results. (See Nos. 176, 177, 171, 170.)

3. *Mechanical.*— Caused by the bending of the uterus forward or backward, tumors, smallness of the canal of the neck of the uterus, or an imperforated hymen. This form of painful menstruation is most common in unmarried women, and those who have not borne children.

Symptoms.— The blood accumulates in the cavity of the uterus, and when it reaches a certain point, it is forced out with a gush, attended by a sudden, severe colicky pain, or cramps. This may be repeated a number of times, or continued through the entire period.

Treatment.— Correction of the obstruction. This requires the attention of a physician. Dilatation and curettage are usually needed.

4. *Membranous.*— In this type a cast of the cavity of the uterus is thrown off. Pain begins with the flow, and increases in severity until almost like labor-pains. This is due to the uterine contractions expelling the membrane.

5. *Ovarian.*— The pain, which is dull in character, is confined to one side or the other, and reflexly it may extend down the thighs or up to the breast or to the shoulder. The breasts are tender. Menstruation is likely to be irregular. There is great tenderness on pressure over the ovaries, which on examination are found to be enlarged, and often out of place. The patient may be depressed in spirits, and feel bearing-down sensations, and pain on walking.

Treatment.— The same as that recommended to be given for neuralgic and congestive dysmenorrhea.

VAGINISMUS

This is an extreme sensitiveness of the vaginal entrance, accompanied by a spasm of the muscle that surrounds the vaginal orifice. It is difficult to assign a definite cause for this condition.

Treatment.— Hot sitz bath, hot douche to the vaginal entrance, using a fountain syringe. (See Nos. 172, 192.) Gradual mechanical dilatation of the vaginal entrance.

VAGINITIS

This is an inflammation of the mucous membrane of the vaginal wall.

Causes.— Pregnancy, injection of irritants, gonorrheal infection, masturbation, extension of inflammation from the external genitals.

Symptoms.— Redness, swelling, mucous membrane dry at first and then moist, finally a watery or purulent discharge. There is a burning pain, a feeling of heaviness, headache, and even a slight fever.

Treatment.— Rest in bed, and the avoidance of all excitement. The external parts should be kept clean. Hot douches, 110°, give the greatest relief and hasten restoration. (See No. 192.) Large quantities of water should be used, with little pressure. A hot douche, 112°, of a saturated boric-acid solution (a dessertspoonful of boric acid to a pint of water); or a hot bichlorid douche, at 112° (one part bichlorid to one thousand parts of water) may be used with beneficial results. A salt douche, a teaspoonful of salt to a quart of hot water, once a day is good. Hot sitz baths are excellent to relieve the congestion. (See No. 172.) Applications of ichthyol are healing. Hot leg packs and hot sitz baths will usually afford speedy relief, by drawing the blood into other parts.

INFLAMMATION OF THE UTERUS

Inflammation of the womb may be a simple catarrhal condition, or it may be due to an infection with pus germs, in many cases following labor or abortion. Simple inflammation often follows exposure, or getting the feet wet.

Symptoms.— The menstrual flow is profuse, and, if a simple inflammation is present, the flow is quite likely to be followed by a leucorrhea.

If the inflammation is due to infection, there will be chills and fever, headache, and severe pain in the uterus, often of a colicky nature. There is a discharge of mucus, pus, and blood. The mucous membrane of the cavity of the womb is thickened, congested, and presents a granular appearance.

Treatment.— Douche of plain water at 115°, followed by a permanganate douche at the same temperature, containing two teaspoonfuls of a saturated solution of potassium permanganate to a quart of water. (See No. 192.) Hot enemas will empty the bowels, and at the same time come almost immediately in contact with the inflamed organ, thus accomplishing fully as much as the hot douche. (See No. 195.) If the inflammation is acute, a hot leg pack with cold compresses over the lower part of the abdomen, will improve the condition of the patient. (See Nos. 176, 186.) The hot sitz bath is another helpful measure. (See No. 172.) Local applications of ichthyol, one part to four parts of glycerin, on a wool tampon, will relieve the congested organ. This should be removed the next day, and the patient given a hot douche.

If the inflammation of the womb is attended with much pain or a feeling of heaviness, the patient should consider rest in bed for a few days as a very necessary part of the treatment, and later to avoid heavy lifting and straining. The sinusoidal current is also useful in treating this disease.

LEUCORRHEA

This condition is usually called the "whites." In leucorrhea there is a milky-white purulent discharge from the uterus, to the great annoyance of the patient. The mucous membrane of the uterus is in a state of lowered resistance.

Leucorrhea is not a disease but a symptom. It is present in chronic inflammation of the womb, in abnormal positions of the uterus, and in inflammation of the pelvis, the Fallopian tubes, or the ovaries. Lacerations and unrepaired tears of the pelvic floor are a frequent cause of leucorrhea.

TREATMENT.— Use daily a hot douche, 115°, or as hot as can be borne, taking one or two gallons of water, with little pressure. (See No. 192.) Hot and cold douches have a tonic influence upon the uterus and vagina. Take hot sitz baths three times a week, also hot and cold, 65°, pelvic or hip packs. (See Nos. 172, 177.) Great pain in the pelvis, with fever, will be relieved by taking a hot leg pack, with cold compresses applied over the abdomen. If cold is not acceptable, apply fomentations. (See Nos. 176, 186, 170.)

Ichthyol and glycerin tampons should be applied three times a week, left in place overnight, and removed the next day. Vaginal wafers containing boric acid, alum, eucalyptol, thymol, and menthol are often of great service.

Leucorrhea indicates general depleted vitality, and hence can not be cured by simply taking local treatment. The entire system needs to be aroused. Proper rest is necessary. The cold sponge bath should be taken in the morning if possible. Fomentations to the spine and liver, salt glows, the assuming of proper standing and sitting positions, with the removal of any exciting causes, will all tend to build up the general health, and so overcome this condition. Attention should also be given to the diet; stimulants should be avoided, and the bowels properly regulated.

Galvanism is frequently a helpful measure. The positive pole should be applied in the vagina, using a current of about twenty-five milliampères. This treatment should be given three times a week, under a physician's order.

If leucorrhea is persistent after taking the treatment outlined above for a few months, the uterus should be curetted.

INFLAMMATION OF THE PELVIS

This is a general term used to cover many more or less local forms of inflammation, such as inflammation of the ovaries, abscess of the ovary, inflammation of the Fallopian tubes, abscess in the tubes, inflammation of the tissues around the womb, or even of the womb itself. These different forms of inflammation constitute a large proportion of the diseases of women. They are all amenable to treatment if taken in time, but if neglected, are destructive, dangerous, and often incurable. Chronic inflammation may in time result in the growth of tumors.

Women who have suffered for years from diseases of these organs may, by careful treatment and proper care, regain their former health. The many patent medicines on the market, advertised in the public press and in circulars as a sure cure for leucorrhea, inflammation of the womb, "falling" of the womb, and other ailments, are a snare and a delusion. Venders of such medicines find a rich and lucrative field in which to operate, knowing that there are few women entirely free from pelvic weakness.

Causes.— Exposure to cold, getting the feet wet during the menses, infection extending from the vagina into the uterus and from there to the tubes and ovaries; gonorrhea is a very common cause; also too frequent child-bearing, miscarriages, infection following childbirth, falls, injuries, heavy lifting, tight lacing, and carrying many skirts suspended from the waist, these crowding down the abdominal organs upon the uterus and ovaries, and producing abnormal positions in these organs.

Symptoms.— Pain is a constant symptom in all pelvic inflammations. If the attack is acute, the pain is usually severe; if chronic, it is of a dull, aching character, with a slight rise of temperature. There is backache, a heavy, bearing-down feeling, and often swelling in the groin.

Symptoms.— Pain in one or both sides, extending down the front part of the limb, or up to the side of the chest and shoulder. Pain in the lower part of the back is nearly always present. Motion increases the pain. Menstruation is irregular or frequent, and lasts eight or ten days. Leucorrhea is usually present between periods. There is a slight fever, with an increased heart action, headache, indigestion, gas in the bowels, constipation, and often a frequent desire to urinate. If an ovarian abscess develops, the fever is higher, the pulse is rapid, the patient is chilly, or may have a severe chill, the skin is cold and clammy, and the pain is more intense and throbbing in character. Peritonitis may result.

If an inflamed ovary is developed and falls behind the uterus, every movement of the bowels will be very painful, likewise any pressure from above. Inflammation of the Fallopian tubes gives rise to almost the same symptoms, and the treatment is the same.

Treatment.— The patient should go to bed, and keep off the feet. Hot vaginal douches, 110° to 115°, should be taken two or three times a day, using at least a gallon at a treatment. The patient should lie on the back, with the knees drawn up. This treatment should take from fifteen to twenty minutes. The very hot enema, 115°, will often give great relief in pelvic inflammation. Hot hip packs once or twice a day, followed by cold compresses, will relieve the congestion and stimulate repair. The hot leg pack, with cold compresses over the abdomen, will give like results. A neutral bath should be taken in the evening, 98° to 94°, for thirty minutes. The general strength should be maintained by cold friction or wet towel rubs two or three times a day. (See Nos. 192, 195, 177, 176, 186, 174, 184.)

Electricity is of service in many cases where there is no

suppuration. In chronic ovaritis the ovary may become cystic. If there is constant pain in the side and hip an operation may be advisable. Many women who think they have ovarian trouble have either acute or chronic appendicitis.

Local treatment may be necessary, such as the application of glycerin and ichthyol tampons, applications of iodin, or dry tampons to hold the womb in place.

ABNORMAL POSITIONS OF THE WOMB

No one position is normal to all women, because the uterus is a movable organ, and varies to suit existing conditions. The uterus, being placed between the bladder in front and the rectum behind, naturally varies its position according to the condition of these organs. The various malpositions of the uterus are the following: anteflexion, or bending forward; retroflexion, or bending backward; anteversion, when it lies too far forward; retroversion, when it is bodily pushed backward. It is said to be prolapsed when it falls below the normal level. Two of these positions may be combined.

Anteflexion of the Uterus.— In this case the organ is bent forward upon itself. It is more common in unmarried women.

Symptoms.— Painful menstruation. The pain, often of a colicky nature, is in front just above the pubes, and precedes the flow. The flow may be scant. It may be necessary to urinate frequently. The neck of the womb is small, and so bent that it offers an obstruction to the normal flow. This obstruction in time may give rise to inflammation of the uterus. In many women who have anteflexion, pregnancy is impossible.

Treatment.— Purely surgical. The neck of the womb needs to be dilated and the uterus curetted. Pregnancy will

always correct this position. For temporary relief of the pain during menstruation, see treatment given under Dysmenorrhea.

Retroflexion and Retroversion.— These two conditions are usually combined. In the former, the uterus is bent backward upon the neck of the womb, while in the latter, the organ points backward instead of forward. It usually lies upon the rectum. This is improperly but commonly called "falling of the womb." The uterus is pushed backward when the bladder is distended.

Causes.— Frequent child-bearing, lacerations or tears of the perineum, a sudden fall attended by the rupture of a ligament, muscular debility, skirts suspended about the waist, increased abdominal pressure, and constipation.

Symptoms.— Backache, dragging sensations in the pelvis, aching in the limbs, weariness, exhaustion, inability to lift, standing is very tiresome, walking is painful, there is irritation in the rectum and in the bladder. Most of these symptoms disappear on lying down. Menstruation is painful, and leucorrhea is usually present. Pregnancy may be impossible.

Treatment.— If there are no adhesions to bind the uterus down, the patient will often find relief by taking the knee-chest position once or twice a day, morning and evening, for fifteen minutes, or until tired. This position, gained by resting upon the knees and breast, with the arms above the shoulders, may be taken on the bed or the floor. This will give the uterus a chance to drop forward; and when the erect position is taken, the intestine drops down upon the uterus, and holds it in place.

Hot douches will relieve pain and the leucorrhea. The bowels should be regulated by a proper diet, and, when necessary, by hot enemas.

A patient suffering from an abnormal position of the pelvic organs, needs the care of a physician. The only rational

cure for backward displacement of the uterus is surgical. If there has been a tear due to childbirth, it should be repaired. Many women have backward displacement, and suffer no inconvenience.

A woman suffering from a backward displacement who is unable to undergo an operation, must necessarily refrain from work that requires heavy lifting, or being on the feet long at a time. Every effort should be put forth to improve the general health, to correct any wrong habits in dress or in standing or sitting positions, and to regulate the diet.

An abnormal position of the uterus can never be corrected by swallowing a "cure-all" medicine or any drug.

CYSTITIS, OR CATARRH OF THE BLADDER

Cystitis is an inflammation of the bladder, and may be acute or chronic. The chronic form is most common.

Causes.— Introduction of infection into the bladder by means of a catheter or other instrument. Exposure is a common cause. From delicacy, women and girls frequently go for many hours without emptying the bladder. The accumulated urine overdistends the bladder, and lessens its resistance to cystitis. Changes in the urine will produce the disease; that is, a urine that is either very acid or very alkalin in reaction. It may follow labor, or extend from other organs, or it may be produced by drugs.

Symptoms.— Pain, which may be violent and come on in paroxysms, is located above the pubes, and radiates down the thighs. Frequent desire to urinate, with intense straining. Patient may have to remain on a vessel for hours, and then pass only a few drops. After the urine is passed, the desire to urinate continues. There is marked tenderness over the pubes. Blood may be present in the urine. At times in acute cases the patient may have chills and fever. Especially is this the case if the inflammatory process extends up the uterus toward the kidneys.

Treatment.— Rest in bed. Hot sitz baths, prolonged neutral baths or packs, hot hip and pelvic packs, or a hot pack to both legs. Avoid cold to the feet. (See Nos. 172, 174, 175, 177, 176.) Keep the bowels free, and drink large drafts of water. The diet should consist of fruits, fruit juices, and dry or toasted breads, or skimmed milk or buttermilk. Flaxseed tea, made by steeping one tablespoonful of ground flaxseed in a pint of water, is excellent. Drink of this freely.

If it is difficult to urinate, the patient may urinate in a warm sitz bath, or while a warm douche is given to the external genital organs. It may be necessary to draw the urine with a catheter. In this case, the catheter should be boiled for several minutes. The external genital organs should be washed thoroughly with soap and water, and then with a saturated boric-acid solution. The hands of the nurse or attendant should be thoroughly scrubbed, and the catheter must not be allowed to come in contact with any object or any part of the patient except the urethra. The labia should be separated with the thumb and forefinger. It is best to use a small glass catheter.

In most cases of chronic cystitis, irrigation of the bladder is necessary. This can be performed only by a physician or a trained nurse. A small glass funnel and a rubber catheter will be required. Introduce the catheter, elevate the funnel, and fill with fluid. Lower the funnel, and the fluid will pass out again. In washing out the bladder, the catheter should always be soft, and introduced without force. The water should be warm, 100°. The fluid should be introduced slowly, and not more than one ounce at a time before drawing it off. This may be repeated several times at one treatment.

Solutions.— Equal parts of boiled water and saturated solution of boric acid, or potassium permanganate, $\frac{1}{1000}$, or hydrastis, one-half ounce to a pint of water.

IRRITABLE BLADDER

This is a condition often present in women. It is due largely to nervousness, but may be caused by pressure on the bladder. The patient has to urinate very frequently, and is distressed by pressure and bearing down at the neck of the bladder. In these cases the urine is usually quite acid. There is no inflammation.

TREATMENT.— Drink eight to ten glasses of water a day, and eat acid fruits freely. Take hot vaginal douches, and hot hip or sitz baths. Rest in bed for a day or two and elevating the hips will make the treatments more effective. For a persistent irritation in the bladder a competent physician should be sought.



CHAPTER XXXIV

Midwifery, or Obstetrics

PHYSIOLOGY OF PREGNANCY

Conception is most likely to occur following cohabitation the first few days after menstruation. During a period of from one to two weeks, beginning ten days after menstruation has ceased, impregnation is least likely to occur. It is now understood that a woman may ovulate, or discharge an ovum, at any period between menstruations.

A woman who has become pregnant enters upon an entirely new phase of life. Every organ of the body, every tissue, every cell, is aroused and prepared to nourish and protect the new vital cell that slowly develops into a human being.

The majority of women have their best health during pregnancy, due to the intense stimulation of every function of the body. Every latent force seems to be aroused.

The most extraordinary changes take place in the uterus. It becomes twenty times heavier than before pregnancy, and its volume is increased nearly five hundred times. The breasts enlarge and become more firm and more sensitive.

At first the digestion may be disturbed, but later the appetite becomes voracious. The blood is increased and circulates more freely, the heart increases in size and strength, the sensibilities increase, and there may be changes in disposition, such as irritability, perverted tastes, depression. The urine is increased in quantity, and is passed more frequently. The general weight increases.

This should be the happiest period of a woman's life.

INDICATIONS OF PREGNANCY

1. *Cessation of Menstruation.*— This is an important sign. A scant flow may appear once or twice after.

2. *Nausea and Vomiting.*— This usually appears about six weeks after the beginning of pregnancy. In one case the writer knew nausea to occur within twenty-four hours. These are quite constant symptoms. The sickness occurs usually in the morning, but in some cases it comes on in the evening. It is a purely reflex condition.

3. Changes in the shape and size of the abdomen.

4. Increased blood supply in the breasts and genital organs, producing a sensation of fulness and tingling.

5. *Frequent Urination.*— This is often a very early sign.

6. *Quickening.*— By this is meant the motion of the child, which can not be felt until the fourth month.

7. Blotching and pigmentation of the face.

8. Enlargement of the breasts, with neuralgic pains. The areola about the nipple increases in size, and changes from a pink to a dark brown.

9. A line of pigmentation extending from the pubes to the navel.

10. Changes in the position of the uterus. In the fourth month, the uterus is on a level with the pubes; in the fifth month, half way to the navel; in six months, on a level with the navel; seventh month, two fingers' width above; in nine

months it almost touches the tip of the breast-bone, and during the tenth month it settles down again.

11. If the vagina and vulva are examined, a deep purple hue is noticed.

12. If the neck of the uterus is examined, it is found to be very soft and relaxed.

13. *Heart Sounds.*— These can be heard about the fifth month. Rate, one hundred twenty to one hundred sixty a minute. Are heard best on the side, below the navel. Until the heart sounds are heard, there can be no positive diagnosis of pregnancy. By the end of two months, however, there may be very strong indications of pregnancy.

Hysterical women who are very anxious to bear children sometimes have what is called a spurious pregnancy. Nearly all the signs of pregnancy are present, with enlargement of the abdomen and the breasts, and they even profess to have quickening.

A tumor of the uterus may cause some of the signs of pregnancy; and a pregnant womb, on the other hand, has been mistaken for a tumor, with a resulting operation. Hence even an expert may be mistaken in his diagnosis, if hasty.

DURATION AND ESTIMATION OF PREGNANCY

Two hundred eighty days is the average duration. Some have gone three hundred ten days. It is not safe to go more than two weeks beyond the two hundred eighty days. Such labors are very difficult. *Estimation.*— Nägele's Rule: Count back three months from the last day of menstruation, and add seven days; in April and September, six days; in December and January, five days; in February, four days. The following table by Adams is very convenient in calculating the duration of pregnancy, and the probable time of labor: —

Table for Calculating the Duration of Pregnancy, and the Probable Time of Labor

Normal labor occurs in about two hundred eighty days from the beginning of the last menstrual period; that date having been ascertained, the figures adjacent to the right hand one of each column will designate the time when the event may be looked for. To illustrate: January 1, confinement would occur October 8; February 1, November 8; May 10, February 14. When the days of the month terminate, the following month will be found at the foot of the column.

Jan.	Oct.	Feb.	Nov.	Mar.	Dec.	Apr.	Jan.	May.	Feb.	June	Mar.
1	8	1	8	1	6	1	6	1	5	1	8
2	9	2	9	2	7	2	7	2	6	2	9
3	10	3	10	3	8	3	8	3	7	3	10
4	11	4	11	4	9	4	9	4	8	4	11
5	12	5	12	5	10	5	10	5	9	5	12
6	13	6	13	6	11	6	11	6	10	6	13
7	14	7	14	7	12	7	12	7	11	7	14
8	15	8	15	8	13	8	13	8	12	8	15
9	16	9	16	9	14	9	14	9	13	9	16
10	17	10	17	10	15	10	15	10	14	10	17
11	18	11	18	11	16	11	16	11	15	11	18
12	19	12	19	12	17	12	17	12	16	12	19
13	20	13	20	13	18	13	18	13	17	13	20
14	21	14	21	14	19	14	19	14	18	14	21
15	22	15	22	15	20	15	20	15	19	15	22
16	23	16	23	16	21	16	21	16	20	16	23
17	24	17	24	17	22	17	22	17	21	17	24
18	25	18	25	18	23	18	23	18	22	18	25
19	26	19	26	19	24	19	24	19	23	19	26
20	27	20	27	20	25	20	25	20	24	20	27
21	28	21	28	21	26	21	26	21	25	21	28
22	29	22	29	22	27	22	27	22	26	22	29
23	30	23	30	23	28	23	28	23	27	23	30
24	31	24	1	24	29	24	29	24	28	24	31
25	1	25	2	25	30	25	30	25	1	25	1
26	2	26	3	26	31	26	31	26	2	26	2
27	3	27	4	27	1	27	1	27	3	27	3
28	4	28	5	28	2	28	2	28	4	28	4
29	5			29	3	29	3	29	5	29	5
30	6			30	4	30	4	30	6	30	6
31	7			31	5		5	31	7		
	Nov.		Dec.		Jan.		Feb.		Mar.		April

July	April	Aug.	May	Sept.	June	Oct.	July	Nov.	Aug.	Dec.	Sept.
1	7	1	8	1	8	1	8	1	8	1	7
2	8	2	9	2	9	2	9	2	9	2	8
3	9	3	10	3	10	3	10	3	10	3	9
4	10	4	11	4	11	4	11	4	11	4	10
5	11	5	12	5	12	5	12	5	12	5	11
6	12	6	13	6	13	6	13	6	13	6	12
7	13	7	14	7	14	7	14	7	14	7	13
8	14	8	15	8	15	8	15	8	15	8	14
9	15	9	16	9	16	9	16	9	16	9	15
10	16	10	17	10	17	10	17	10	17	10	16
11	17	11	18	11	18	11	18	11	18	11	17
12	18	12	19	12	19	12	19	12	19	12	18
13	19	13	20	13	20	13	20	13	20	13	19
14	20	14	21	14	21	14	21	14	21	14	20
15	21	15	22	15	22	15	22	15	22	15	21
16	22	16	23	16	23	16	23	16	23	16	22
17	23	17	24	17	24	17	24	17	24	17	23
18	24	18	25	18	25	18	25	18	25	18	24
19	25	19	26	19	26	19	26	19	26	19	25
20	26	20	27	20	27	20	27	20	27	20	26
21	27	21	28	21	28	21	28	21	28	21	27
22	28	22	29	22	29	22	29	22	29	22	28
23	29	23	30	23	30	23	30	23	30	23	29
24	30	24	31	24	1	24	31	24	31	24	30
25	1	25	1	25	2	25	1	25	1	25	1
26	2	26	2	26	3	26	2	26	2	26	2
27	3	27	3	27	4	27	3	27	3	27	3
28	4	28	4	28	5	28	4	28	4	28	4
29	5	29	5	29	6	29	5	29	5	29	5
30	6	30	6	30	7	30	6	30	6	30	6
31	7	31	7			31	7			31	7
	May		June		July		Aug.		Sept.		Oct.

HYGIENE OF PREGNANCY

1. *Mental.*— Every pregnant woman should remember that she is molding another life and character. She should be cheerful, happy, and contented, avoiding excitement, anger, passion, and worry. She should seek to control every feeling to the best of her ability.

2. *Recreation.*— Household duties are usually sufficient to occupy the attention of most women. However, a woman should make it a rule to be out in the fresh air every day. Walking is the best exercise. It is a false state of society

that induces a pregnant woman to confine herself to closed walls, and only appear out after dark, as if she were a criminal, or ashamed of her condition. A normal woman should be almost unconscious of her condition. This will have a happy influence upon others.

The popular notion that a pregnant woman should avoid all study or hard mental effort is another erroneous view, that should be relegated to the past.

3. *Dress.*— Corsets, tight bands, and heavy skirts should never be worn. Every garment should be comfortable, free and easy, and equally distributed. Combination suits are the best. The limbs should be well protected.

4. *Diet.*— A wholesome, unirritating diet should be adopted, but not too rigid or extreme. Tea and coffee should be avoided, and, as a rule, meat. However, at times a little beef or chicken satisfies a craving that will be easily dissipated if indulged. Pickles and all condiments should be avoided. Sweet natural wines of grape, blackberry, or other juices will often be relished. Free water drinking is important. Excessive eating of meat during pregnancy will cause a large-boned child, and a larger head, making labor more difficult.

5. *Bathing.*— If the patient is accustomed to it, a cold sponge or plunge in a bath tub, followed by vigorous friction with a coarse towel, should be taken every morning until it becomes inconvenient to do so,— at least during the first four or five months. If one is not used to cold water, cold applications to the abdomen should be avoided. A warm bath should be taken once a week.

Many of the difficulties of labor can be relieved if the patient will follow a few simple treatments during the last two months of pregnancy. *Sitz Bath.*— Begin the bath at 96°, and gradually lower the temperature to 88°; continue the treatment fifteen minutes. Dry thoroughly. This may be taken daily or three times a week. *Neutral Bath.*— 98°

to 94°. This may be taken each evening, or on special occasions. If the patient is troubled with insomnia, nervousness, or various pains, the neutral bath for thirty minutes gives the most gratifying results.

The douche, at 100°, should be taken occasionally, for cleansing purposes only. Avoid hot or cold douches, hot or cold foot baths, and any very long hot applications to the abdomen. Pains in the back or abdomen will be relieved by short but very hot fomentations, five to ten minutes. (See Nos. 192, 170.)

6. *Nausea and Vomiting.*— If severe, remain flat on the back, and do not raise the head. Apply a cold compress or a girdle compress over the stomach and cover with a flannel. (See Nos. 186, 188.) Sip hot water, hot lemonade, ginger tea or ginger ale, or a little carbonated water. Fifteen to twenty grains of subnitrate of bismuth or bicarbonate of soda will relieve some patients, especially where there is nausea after eating, due to fermentation.

If the vomiting is persistent, an ice-bag over the stomach or a hot or cold trunk pack may be necessary. Sustain the strength by cold friction and cold towel rubs. (See Nos. 199, 175, 184.)

Ichthyol tampons applied to the neck of the womb will, in some cases, stop the vomiting.

7. *Constipation.*— See that the bowels move regularly. They can best be regulated by exercising care in the selection of the diet. The enema may be necessary. If a laxative is necessary, take a teaspoonful of aromatic cascara at bedtime. The aromatic preparation is the best. Active purgation should be avoided.

8. *Teeth.*— Any needed dentistry should be attended to during the first two or three months.

9. *The Breasts.*— If the nipple is small or flat, it should be massaged by drawing it out with the thumb and fingers. The nipples may be hardened by rubbing them daily with

witch-hazel, tannic acid in alcohol, twenty grains to the ounce, or alcohol alone.

10. *Cracking of the Skin Over the Abdomen.*— This may be prevented by rubbing the abdomen every night after the sixth month with olive-oil or sweet-oil or with cold cream.

11. *Varicose Veins.*— These are caused in the legs by the pressure of the uterus upon the veins. They can not be prevented, but will be relieved by keeping off the feet as much as possible.

12. *Urine.*— This should be examined frequently, to see that the kidneys are in good condition.

ABORTION, MISCARRIAGE, AND PREMATURE LABOR

Abortion.— The expelling of the ovum before the fourth month. *Miscarriage.*— Expulsion of the ovum from the fourth to the seventh month. *Premature Labor.*— Delivery of the fetus after the sixth month but before the full term.

Causes.— Death of the fetus, diseases of the membranes, induced abortion, hemorrhage, long walks, purgatives, riding in a carriage or on the cars, overwork, worry, fear, fright, fevers, sexual intercourse, irritation of the breasts, falls, vomiting, convulsions, epilepsy, chorea, diseases of the ovaries, and uterine contraction.

Symptoms.— Hemorrhage, pain like labor-pains, and expulsion of the ovum and membranes.

Treatment.— *Threatened Abortion.*— Absolute rest in bed. Elevate the hips by placing a pillow under the patient. Thirty drops of the fluid extract of viburnum prunifolium may be given every three or four hours. Some form of opium is often given in cases of this kind, but usually it is not necessary.

Complete Abortion.— A physician should be called in any case of abortion, but the patient will be perfectly safe in taking douches at 110° two or three times a day. The

douche tube should be disinfected by boiling; and the external parts should be thoroughly cleansed with soap, and with water that has been boiled. There is always great danger of infection following an abortion, especially where it has been intentionally performed. The patient should not get up for a week or ten days.

LABOR

By this is understood the active process of expelling the child at term, by the contraction of the uterus and abdominal muscles, with a distention of the birth canal. For convenience, it is divided into three stages, and the signs of labor are three: First, pains in the uterus and pelvis, coming on at intervals of five minutes to half an hour, but, as a rule, about fifteen minutes apart. The pains usually come on suddenly, and each one lasts about a minute. Second, the dilatation of the neck of the uterus. Third, the discharge of a little bloody mucus from the vagina. Two to four weeks before labor begins, the uterus settles into the pelvis.

First Stage of Labor.— This stage marks the time from the beginning of labor until the neck of the uterus dilates sufficiently to allow the head of the child to pass out. The duration is from ten hours to several days. The average time is fifteen hours. During this stage the patient does not have bearing-down pains; in fact, she is inclined to resist the pain, for the contractions are uterine. Every time the uterus contracts, "the waters" are forced down, and this in turn crowds the membrane down, forming what is called the "bag of waters." The bag of waters is forced down ahead of the child, and dilates the entire birth canal. It usually does not break until the neck of the womb is sufficiently dilated. At times it breaks early in labor, and causes what is commonly known as a "dry labor." The bag of waters is a very important factor in a normal labor, and, as a rule, should not be interfered with.

Treatment.—A thoroughly cleansing warm enema should be taken in the early stage if possible, and it is very important to see that the urine is passed frequently.

If the patient is strong, she should be encouraged to walk or sit up, for this will facilitate labor. During a pain she can kneel by a chair or at the bedside, or lean upon an assistant.

If the labor is slow and prolonged, it will be greatly facilitated by vaginal douches every half hour, taken at 105°, with little pressure. In addition a hot foot bath or a hot sitz bath may be taken. Fomentations may be applied to the abdomen and back. (See Nos. 172, 170.)

Cold compresses to the abdomen or to the breasts will stimulate contractions.

If a nurse is in attendance upon a woman in labor, she should give the patient an enema, and thoroughly cleanse the external genitals with soap and water.

She should also see that the bed is provided with a rubber sheet, a draw sheet, or oil paper or oilcloth. The silk or linen cord should be ready for tying the baby's cord; also gauze for washing the baby's eyes, hands, and mouth, and scissors for cutting the cord. See that there is abundance of hot water.

Second Stage of Labor.— This is the period from the dilatation of the uterus to the birth of the child. The duration is from a few minutes to several hours. After the first child, labor is much more rapid, especially the second stage. In this stage the patient has to bear down, and so all the expiratory muscles are brought into action.

PROCEDURE FOR OBSTETRICAL NURSES

I give the following instruction to nurses who are present with me upon confinement cases: —

1. The bed of the patient should be made the first thing.

2. Give an enema at 105°, if patient is in first stage of labor. In most cases this can not be done when the second stage is well under way.

3. If patient has not passed urine for some hours, and is not able to do so, it should be drawn with a No. 9 catheter.

4. Thoroughly wash the external genitals and thighs with soap and water, and then cleanse with a bichlorid solution, $\frac{1}{2000}$.

5. The patient should now be placed on her back, and prepared for an examination by the physician: first, the abdomen, by having it covered with a single sheet; second, a vaginal examination, to determine presentation and the progress of labor.

6. If there is abundance of time, napkins may be made for the patient, preferably from cheese-cloth and absorbent cotton.

7. Cut six pieces of gauze five inches square, and place in a cup partially filled with a half saturated boric-acid solution, to be used in cleansing the baby's eyes, mouth, and hands.

8. See that the gauze for cleansing the eyes, the silk for tying the cord, the scissors, and a bottle of vinegar are placed together and conveniently near.

9. A bowl of bichlorid solution, $\frac{1}{1000}$, should always be ready for the use of the physician, also one with plain boiled water.

10. See that there is an abundance of hot water.

11. Do not get excited.

Treatment.— *a*. The patient should be undressed and put in bed. She will naturally assume the position that gives her the greatest comfort.

b. During a pain, the patient has a desire to pull on something, to grasp something, or to bite on a handkerchief. She can be most advantageously helped by having her lie on her back, with the thighs flexed. At the beginning of a pain,

take both her hands, and let her place both knees against your chest. This will give both the patient and the assistant something to pull against. The husband should assist in this work. When a pain begins, the patient should be instructed to take a deep breath, to hold it, and then bear down; and then to get another full breath, and repeat the bearing down until the pain is over. This procedure gives the patient great relief, occupies her mind, and facilitates labor.

c. Between pains, encourage the patient to sleep. A few minutes' sleep is wonderfully refreshing.

d. The forehead, face, neck, and hands should be frequently bathed with cold water.

e. Give frequent sips of water.

f. See that the room is not too warm.

g. If the pains are weak and inefficient, they will be increased by applying cold compresses to the abdomen every ten minutes.

h. Great pain in the back will be relieved by fomentations, a hot-water bag, or by rubbing.

i. When the head reaches the perineum, determined by examination by the physician, the nurse should be ready to place the patient crosswise of the bed, in the Sim's position, with a folded blanket or a pillow between the knees. Surgical stockings extending nearly to the hips should protect the limbs. A rubber bed-pad should be placed under the hips, the night-dress drawn up to the waist, and the patient covered with a sheet.

j. The husband or some friend (one is nearly always present) can sit by the patient's head, and attend to any necessary wants.

k. Always in the first labor, and very frequently in any labor, hot compresses should be applied to the perineum, changing every two minutes. This relaxes the parts and helps to prevent laceration.

l. Bits of cotton should be ready at hand to keep the perineum clean, also some receptacle for waste.

m. If the light is not good, one should be placed near by on a table or stand.

n. A bowl of bichlorid solution, $\frac{1}{1000}$, should be within easy reach of the physician.

o. A blanket or cloth of some kind should be warming, ready to receive the baby; and the albolene should be warmed by placing in a bowl of hot water, to be used in oiling the baby.

p. A douche bag, tubes, thermometers, and hot water should be ready, if necessary to give a douche for hemorrhage. In such a case, the boiled water should be 125°.

q. Both nurses should be present at the bedside while the child is born.

r. As soon as the baby is born, one nurse should hold the dish containing the gauze in boric-acid solution near, so that the physician may wash the eyes, mouth, and hands of the infant. The second nurse should have the blanket to wrap up the baby at once, to avoid exposure.

s. The silk and scissors should be ready, so that the physician may tie and cut the cord as soon as it stops pulsating. The baby must then be warmly wrapped up, put in a warm place, and left until the mother has been cared for.

3. *Third Stage.*— The time for the expelling of the placenta, or afterbirth.

Duration.— Fifteen to thirty minutes. The nurse should be present, and may hold a granite basin or the lid of a chamber against the lower buttock, to receive the placenta and membranes, while the physician gently manipulates the uterus over the abdomen. The placenta should then be carefully examined.

Treatment.— *a.* Wash the patient, change the bedding, and remove the soiled night-dress. Watch the pulse, and be on the lookout for hemorrhage.

b. The physician should examine for any lacerations, and, if necessary, repair such.

c. Put on a binder, extending from the pubes to the waist. A towel should be folded and placed just above the uterus, and held in place by pinning it to the binder. The napkins should then be adjusted.

d. Rub the baby with warm albolene. See that no bright light strikes its eyes.

e. The physician will dress the cord, or it may be dressed by dusting with boric-acid powder, then wrapping in sterilized gauze or in a baked cloth. To do this, cut a small hole in the center of a piece of gauze about four inches square, and draw the cord through it, pointing the cord diagonally upward toward the left. Place the binder over it, and pin securely. The cord should be kept dry; when dressing the infant, the nurse should dust a little boric-acid powder around its base. In the absence of boric-acid powder, use olive-oil. The cord drops off in from four to twelve days.

THE PUERPERIUM

This is the period from the birth of the child to the time when the uterus regains its normal size, which is usually six weeks. During the first ten days the patient needs special care. The following points should be attended to: —

1. See that both mother and child urinate daily, and that the bowels move.

2. Note the pulse, temperature, and pain if any.

3. With the first child the mother is quite free from after-pains.

4. The patient should flow quite freely the first few days; then the flow becomes light in color, and scant, until it ceases, about the tenth day or a little later. If the flow becomes foul about the fourth day, and the patient suffers from abdominal pains and headache, there is probably some infection.

5. The milk should appear after the first forty-eight hours. See that the breasts do not cake.

Treatment.— Daily enema, at 105°, using bedpan. A soap wash the next day; after that cold mitten friction daily, beginning at 75° and lowering two degrees a day, to 60°. The vaginal douche may be taken, although this is not always necessary. If required, it should be of plain boiled water, 110°, followed by a permanganate douche, two teaspoonfuls of a saturated solution to a quart of water, at 110°. Under normal conditions the douche is unnecessary. However, in case the flow stops, or is scant, brown, of foul odor, and the patient has pelvic pains and fever, give as described. It may be necessary to repeat once in six hours. Before giving the douche, be sure to cleanse the external parts thoroughly, and to disinfect the glass tube by boiling. A rubber tube can be disinfected with a five-per-cent solution of carbolic acid, or with a solution of bichlorid of mercury, $\frac{1}{1000}$. If the symptoms become more severe, and blood-poisoning is imminent, in addition to the douches give the hot hip pack for one hour every four hours, and follow by cold friction. (See Nos. 177, 184.) If the flow is scant, and there is headache, give a hot foot bath, with cold compresses to the head and neck. (See Nos. 171, 186.)

After-Pains.— If very severe after the first night, give fomentations above the pubes and to the back for five or six minutes at a time. (See No. 170.)

Care of the Breasts.— Cleanse the nipples before and after each nursing with a saturated boric-acid solution. Let the baby nurse every four hours the first two days. By keeping the nipples clean, cracking may be avoided. If the breasts become hard, there is danger of "cake breast." If taken in time, any hardness can be entirely removed by massage, in from thirty to sixty minutes. The gland should be manipulated from the outer border toward the nipple. If the soreness remains, and the breasts become tender,

apply very hot fomentations for from twenty to thirty minutes, and follow by cold compresses, changing once in ten minutes. Continue for two hours. It may be necessary to repeat this treatment several times. A breast binder frequently gives the patient great relief.

In case the child dies, or it is necessary to feed it artificially, the milk may be checked by applying camphor cloths over the breasts, covered with a binder. Use a breast-pump just enough to prevent the breasts from caking. A belladonna ointment applied to the breasts will also check the milk. It is said that linseed-oil will have the same effect.

Urination.— After childbirth there is a tendency to retention of urine. A woman should not go more than twelve hours without urinating. By applying hot compresses over the external genitals for fifteen minutes, and lifting the patient upon a vessel, with shoulders elevated, urination is sometimes possible. If, with this assistance, she is unable to urinate, a rubber catheter may be used after being boiled, and the parts thoroughly washed with soap and water.

The Bowels.— The bowels are sluggish after labor, because of the relaxed state of the abdominal muscles, and the weakness of the intestinal muscles. The position of the patient also favors constipation. So long as the patient is in bed, give the enema if possible; otherwise, give castor-oil, one tablespoonful, or cascara sagrada, one teaspoonful of the aromatic preparation before breakfast.

Diet.— Milk, toasts, well-cooked grains, soft poached eggs, egg toast, prunes, blueberries, and other subacid fruits. After the first week the normal diet may be adopted. Very acid fruits do not seem to agree with the baby, though this varies in different individuals.

The Skin.— Patient may sweat profusely after labor. If so, rub with a dry towel occasionally.

The Baby.— The baby, as soon as born, and the cord is cut, should be oiled with albolene or olive-oil. It is not

necessary to bathe the child until the second or third day. After this it should be bathed daily, in a warm room, in water at 98°, lowering one degree a week until the water is 90°. Before removing the child from the bath, rub it with water a little cooler. The thermometer should always be used, for it is unreliable to guess at the temperature. Use non-irritating soap.

The new-born urinates from six to twenty times in twenty-four hours, and the bowels should move about four times in the same period.

The eyes should be observed carefully for any inflammation. If sore, cleanse with a saturated boric-acid solution. Be careful to protect the eyes from any bright light.

COMPLICATIONS OF LABOR

Hemorrhage.— Caused by prolonged, exhausting labor, relaxed uterus, retained placenta and membranes, general weakness.

Treatment.— Elevate the hips of the patient. Stimulate contractions of the uterus by manipulations, by grasping the uterus through the abdominal wall, by short applications of a cloth dipped in ice-water, by striking the abdomen with a cold wet towel; put the baby to the breast at once. This stimulates powerful uterine contractions. Change from one breast to the other. Work fast, but keep a cool head.

If the patient has lost much blood, give a rectal injection, with the hips elevated, of water at 110°, containing one and one-half teaspoonfuls of salt to the quart of water. Keep the patient warm, and give hot drinks and fluid nourishment. This will quickly restore the volume of blood.

Convulsions, or Eclampsia.— Convulsions may occur any time during pregnancy or during labor, or even after labor.

Causes.— They are due to poisons retained in the blood, that ought to be eliminated by the kidneys. The actual

cause is obscure. Albumen is usually found in the urine before the attack and always during it. Eclampsia occurs once in every three hundred cases. It is more common during the first pregnancy, and in those who are well advanced in years.

Symptoms.— Eyes stare, pupils contract, eyelids twitch, eyeballs roll, mouth is pulled to one side, and then the spasm spreads to the neck, arms, and trunk. The patient loses consciousness for a few minutes or permanently. One attack may follow another until the patient passes into a stupor. The temperature rises. The mortality is about one in three cases.

Treatment.— If there are indications of Bright's disease before labor begins, the greatest care is necessary. Avoid cold applications and a meat diet. Drink freely of water. Improve the general health as much as possible. During the attack the patient may be given hot treatments, as the hot wet blanket pack, followed by the dry blanket pack; hot saline enemas, at 112°; ice compresses to the head and neck; and, after the first hot pack, the heating compress to the chest, changing every hour. (See Nos. 175, 195, 186.) A hot normal salt solution should be given by rectum slowly. Large doses of salts may be given. Morphin in large doses is often given, but its use is not advised.

Puerperal Fever.— This is commonly known as the fever of childbed, or blood-poisoning.

Causes.— Infection of the birth canal, retention of portions of the placenta or of the membranes. It is more common after a miscarriage or an induced abortion.

Symptoms.— Headache, coated tongue, loss of appetite, fever, thirst, nausea at times, a foul discharge, brownish in color, and marked pain in the abdomen, with tenderness over the uterus.

Treatment.— Hot douches of a solution of bichlorid of mercury, $\frac{1}{5000}$, every six hours. The physician called will

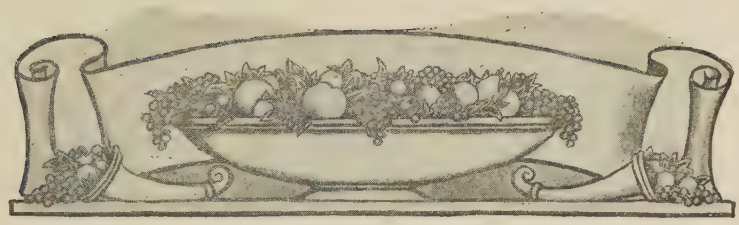
usually curette. Hot hip pack for one hour, two or three times a day if necessary, followed by cold friction. (See Nos. 193, 177, 184.) Light diet of gruels, broths, or skimmed milk.

Milk-Leg (*Phlegmasia Alba Dolens*).— This is an inflammation of the femoral vein occasionally following childbirth. It is characterized by swelling of the leg, without redness.

Causes.— Infection of the veins of the leg following labor. The disease comes on from ten days to two weeks after labor.

Symptoms.— Pain in the leg, beginning at the ankle and extending upward. Stiffness and heaviness, marked swelling, tenderness along the veins. The left leg is more commonly involved.

Treatment.— Absolute rest in bed, on the back. Elevate the leg on several pillows. Give hot pack to the leg every three hours during the day, followed by cold compresses, changing every twenty minutes. The leg should not be used for several days after all swelling and tenderness have disappeared. (See Nos. 176, 170, 186.) No massage should be given to the leg in such cases.



CHAPTER XXXV

Skin Diseases

ECZEMA

Synonyms.— Moist tetter, vesicular dermatitis. Eczema of the hands is called salt-rheum.

Causes.— This is one of the most common of all skin affections. It results from gastric or intestinal indigestion; from pork-eating, diabetes, Bright's disease, gout, heat; from occupations, such as that of mason, laundress, baker; from acids, alkalies, chafing, and rubbing of the skin.

Symptoms.— Intense itching and a weeping of the skin are the two principal features of the disease. The skin may be red, swollen, and moist; and there may be little elevations, or papules; little blisters, or vesicles; or little pustules. The skin feels hot and is puffy.

Eczema may appear on any part of the body. Eczema of the genital organs in both men and women is especially troublesome.

Treatment.— The first thing to do is to remove the cause if possible. The diet must be corrected. It is impossible to cure eczema while one eats pork or uses alcohol or tobacco. The general health should be improved by general tonic treatment.

External Treatment.— Cleanse with tar-soap and water. Then apply one of the following ointments (all ointments should be rubbed in thoroughly but gently): —

Acute Form.

℞ Salicylic acid ..... 20 grains
Ichthyol ..... 30 grains
Zinc ointment ..... 1 ounce

M.

Sig.: Apply twice daily.

℞ Carbolic acid ..... 10 grains
Oil of tar ..... ½ dram
Zinc ointment ..... 1 ounce

M.

Sig.: Apply night and morning.

℞ Zinc oxid ..... 1 dram
Ichthyol ..... 1 dram
Lanolin ..... 4 drams
Petrolatum (vaselin) ..... 4 drams

M.

Sig.: Apply night and morning.

Chronic Form.

℞ Ichthyol ..... 4 drams
Vaselin ..... 4 drams
Lanolin ..... 4 drams

M.

Sig.: Apply night and morning.

℞ Ichthyol ..... 2 drams
Oil of tar ..... 1 dram
Zinc ointment ..... 1 ounce

M.

Sig.: Apply night and morning.

℞ Ichthyol ..... 15 minims
Resorcin ..... 15 grains
Salicylic acid ..... 6 grains
Lanolin ..... 3 drams
Vaselin ..... 2 drams

M.

Sig.: Apply in forms where the stronger ointments cause irritation.

The Dry, Oily Form (Squamous).

℞ Ichthyol ..... 30 grains
Precipitated sulphur ..... 30 grains
Petrolatum (vaselin) ..... 5 drams
Lanolin ..... 5 drams

M.

Sig.: Apply morning and night.

Baths.— Hot sponging, fomentations, hot and cold sprays, and prolonged cold applications. If cold is of short duration, the itching will be increased. Hot applications should be followed by one of the ointments named above. The X-ray has been used in some cases with gratifying results. In obstinate forms, it should be given a trial. (See Nos. 179, 170, 186.) Patience and persistence are required in the treatment of eczema, in order to achieve success.

URTICARIA

Synonyms.— Nettle-rash, hives.

This is a very common skin disease, characterized by elevated red wheals, varying in size from a lentil to the palm of the hand, and attended with itching and stinging sensations.

Causes.— Indigestion, poisons from the alimentary canal, strawberries, lobsters, crabs, almonds, cheese, oysters, quinin, salicylic acid, antipyrin, potassium iodid, bedbugs, mosquitoes, fleas.

Symptoms.— Sudden appearance of wheals, with a round, red, elevated border, and often a pale center, occurring especially on the face or trunk. The wheals may appear in crops. The duration is variable. Intense itching is present. The entire body may be involved, with the swelling of the ears and face. The patient suffers intensely.

Treatment.— Cold bathing, cold compresses, bathing with alcohol, vinegar, or lemon-juice. Avoid friction. The prolonged neutral bath gives excellent results in allaying the irritation of the skin, and in quieting the nervous system. Soft underclothing should be worn. (See Nos. 179, 186, 181, 182, 174.) Bathe the parts with one of the following lotions: —

℞ Carbolic acid ..... 1 dram
Glycerin ..... ½ ounce
Alcohol ..... 5 ounces
Water sufficient to make a pint.

M.

Sig.: Apply on the affected parts several times daily.

℞ Oil of thyme ..... 15 minims
Carbolic acid ..... 30 grains
Alcohol ..... 6 ounces

M.

Sig.: Bathe the skin several times a day.

For hives due to insect bites apply pure ichthyol.

℞ Ichthyol ..... ½ ounce
Glycerin ..... ½ ounce

M.

Sig.: Apply with a feather several times a day.

Talcum powder frequently relieves itching in a child. Adults troubled with hives should take a tablespoonful of salts and a thorough warm enema.

ACNE

Synonym.— *Acne vulgaris.*

An inflammatory disease of the sebaceous glands about the face and shoulders.

Causes.— Most common at puberty and up to twenty years of age. Caused by indigestion, pork-eating, and greasy or fried foods. It is at times due to cosmetics, lack of soap, veils, tight collars, constipation, or to pelvic disorders.

Symptoms.— Small red, hard elevations on the face and back, varying in size from a pin-head to a pea. They are painful and tender. At times nodules and pustules form. The disease may continue for months or even years if not properly attended to.

Treatment.— Carefulness in diet, avoiding fats, fried foods, meats, rich foods, pastry, hot breads, and cakes. Fruits and grains should be eaten freely. Acne is cured more from within than by any drug applied externally. No young man can be cured of acne so long as he uses alcohol or tobacco in any form. This disease or any other skin disease is not cured by any "blood purifier" on the market. The blood is made from what we eat and drink, and if this is pure and wholesome, the blood will be pure. Constipation must be relieved. A daily evacuation of the bowels is necessary.

Local.— At the beginning of the development of a nodule on the face, the direct application of ice may abort it. Bathe the face in very hot water, washing thoroughly with a good green soap (hot compresses may be substituted for the hot bathing); dry with a soft towel, and apply one of the following ointments: —

℞ Precipitated sulphur ..... 1 dram
Vaselin ..... 1 ounce
M.
Sig.: Apply at night.

℞ Ichthyol ..... 20 grains
Salicylic acid ..... 5 grains
Precipitated sulphur ..... 30 grains
Starch ..... 1½ dram
Zinc oxid ..... 1½ dram
Vaselin ..... 4 drams
M.
Sig.: Apply at night.

The X-ray gives good results in some cases, also the dermal lamp. The acne punch is recommended by some. It is well to remember that acne is not cured in a week. It will take months to effect a cure; so patience is required while taking any course of treatment.

HERPES ZOSTER

Synonym.— Shingles.

This is an inflammatory disease of the skin, characterized by groups of small blisters, or vesicles, following the course of the nerve trunks.

Causes.— Some disturbance in the nutrition of the nerve-endings.

Symptoms.— A group of little blisters appearing along the course of a nerve trunk, following an attack of neuralgia, most often intercostal neuralgia. From eight to a dozen appear at a time, and vary in size from a pin-head to a small bean. Sharp pains attend the eruption, and the vesicles give a sensation of heat and burning. Only one side, as a rule, is involved. The blisters dry, and form yellowish-brown crusts, which, on falling off, may leave little scars. One attack is all that usually appears in a lifetime.

Treatment.— Do not rupture or open the vesicles. Ointment should not be used. Apply olive-oil and cover with cotton. Apply a bandage to prevent the clothes from rubbing the skin. A dry dusting powder, such as powdered starch or powdered zinc oxid, dusted on and covered with a bandage, will be all the treatment that is necessary.

PSORIASIS

A chronic inflammation of the skin, characterized by circular reddish patches, covered with whitish, lustrous, adherent scales. It is one of the most frequent of skin diseases.

Causes.— Not known. It is influenced by heredity, gout, rheumatism, dyspepsia, and lack of sunshine. Appears early in life, and is not limited to sex, occupation, or station.

Symptoms.— The lesion is at first small, reddish, covered with small whitish scales, which can be removed with the finger-nail. There is a tendency to bleed after the scales are removed. The affected areas may increase to the size of a dollar, and appear on all parts of the body, except the palms of the hands and the soles of the feet. Psoriasis occurs most frequently on the back of the arms and legs, about the elbows and knees.

The eruption is always dry, chronic in course, and never contagious. It is worse in winter than in summer. At times the scales are very abundant. The writer saw one case in Philadelphia where more than a heaping handful of scales could be collected every twenty-four hours. No sensations accompany the eruption, as a rule. At times there may be pain in the joints, itching, and burning.

Treatment.— A well-selected, wholesome diet, avoiding tea, coffee, meat, alcohol, tobacco. Fruits, vegetables, and cereals may be eaten freely. Avoid overwork and obtain abundance of sleep. Improve the general health by tonic baths, such as cold sprays, cold plunge baths, and the neutral bath, prolonged even to eight hours (see No. 174); take frequent soap shampoos, using green soap, followed by a cold spray or a cold sponge, and the application of some healing ointment. Alkaline baths and effervescent baths are stimulating and curative. Sulphur baths are excellent, taken at 95°. The following soap may be applied: Equal

parts green soap, liquid pitch, precipitated sulphur, and dilute alcohol. A plain tar soap is beneficial.

℞ Ichthyol ..... 1½ dram
Chrysarobin ..... 1 dram
Salicylic acid ..... 1½ dram
Olive-oil ..... 5 drams
Lanolin ..... 5 drams
M.
Sig.: Apply morning and night after bathing and thoroughly drying with a coarse towel.

℞ Ichthyol ..... 45 grains
Salicylic acid ..... 15 grains
Tar ..... 45 grains
Pyrogallic acid ..... 30 grains
Lanolin ..... 6 drams
Vaselin ..... 2 drams
M.
Sig.: Apply after bathing.

DANDRUFF

This is due to an increased activity of the oil-glands of the scalp. If the dry, oily scales are allowed to collect, the nutrition of the hair will in time suffer, and baldness will result.

Other forms of this disease may appear on the breasts or about the genital organs. It is aggravated by sedentary habits, constipation, indigestion, and fevers.

Treatment.— Salt glows, saline baths, cold plunges, cold friction, and the correction of any wrong habit. (See Nos. 190, 180, 184.)

Local.— If the crusts are thick or abundant, use olive-oil, almond-oil, vaselin, or even lard freely, rubbing in with the finger-tips, and allow to remain overnight. The next day shampoo the head, using green soap or tar soap, and rinse the hair thoroughly. This treatment may be applied

to any part of the body. A sulphur ointment is one of the best: —

℞ Sulphur ..... 2 drams
Cold cream ..... 1 ounce
M.
Sig.: Apply with the tips of the fingers.

The following lotion is excellent to rub into the scalp: —

℞ Resorcin ..... 20 grains
Alcohol ..... 5 drams
Water ..... 5 drams
M.
Sig.: Rub into the scalp.

Frequent washing of the scalp in cold water, with friction, is often all that is necessary.

BALDNESS

This is a partial or complete deficiency of hair. The baldness of old age is symmetrical. In the earlier years the hair may come out in patches, following some disease. After typhoid fever, the hair may all come out. In syphilis, it comes out in areas.

Causes.— It may be congenital. In old age it usually begins at the crown or the brow, and is associated with atrophy of the hair follicles. A very common cause of baldness is dandruff and parasitic scalp disease.

Treatment.— Stimulate the circulation and nutrition of the scalp by frequent shampooing, friction by dipping the fingers into ice-water and then rubbing the scalp, friction with suitable hair-brushes, and by hot and cold douches. For dandruff see treatment of that disease, page 474.

Many of the hair tonics on the market are worthless, and often injurious. The following are lotions that may be rubbed into the scalp with benefit after shampooing: —

℞

Quinin sulphate	30	grains
Tincture of cantharides	1	dram
Spirits of aromatic ammonia	1	ounce
Bay rum	5	ounces
Oil rosemary	5	drops

M.

Sig.: Rub into scalp after shampooing.

℞

Tincture of cantharides	1	ounce
Carbolic acid	1	dram
Castor-oil	1½	dram
Bay rum	4	ounces

M.

Sig.: Rub into scalp after shampooing.

BLACKHEADS

Synonym.— Comedo.

Causes.— Occupation, constipation, neglect of soap. The sebaceous ducts, becoming constipated, are plugged with a fatty or cheesy material, which often contains a parasite, called the *Acarus folliculorum*, or the *Demodex folliculorum*.

Treatment.— Bathe the face with tar soap and water, and follow by vigorous friction. Alternate very hot and cold compresses for from ten to twenty minutes at bedtime, and follow by a sulphur ointment. Blackheads may be removed with an extractor, a watch-key, or the finger-nails. A sulphur ointment is of the greatest service. Use thirty grains to one ounce of cold cream.

Massage of the face is a useful measure, also hot and cold sprays, sunshine, and outdoor work or exercise.

EXCESSIVE SWEATING

Treatment.— Hot and cold sprays, cold bathing, cold water friction, vinegar rubs, and a dusting powder containing equal parts of salicylic acid, pulverized zinc carbonate,

talcum, and starch. Avoid hot baths and excessive drinking of water or any other fluid. (See Nos. 179, 184, 182.)

SWEATING FEET

Treatment.— Bathe in cold water night and morning, with vigorous friction; wrap the feet in cold compresses at night; use a dusting powder during the daytime. Bathing the feet in alum-water or ammonia-water (one ounce in a pint of cold water) will check the sweating. The dusting powder given above is also useful.

POISON IVY

Treatment.— Bathe with hot water containing a teaspoonful of soda to the pint of water. Cold compresses wrung from the same give great relief. Bathing the skin with lime-water or ammonia-water also gives excellent results. The following ointment may be applied several times a day, till the irritation is relieved: —

℞ Ichthyol ..... 2 drams
Vaselin ..... 1 ounce
M.
Sig.: Apply as directed.

Or wash with hot water containing two teaspoonfuls of sugar of lead to the pint. Never use an acid wash or an acid ointment of any composition for poison ivy.

CHILBLAIN

Treatment.— Rub with snow or with ice-water until the feet are warm, then apply the ointment given above, under Poison Ivy. For the itching of chilblain, bathe with cold water, and keep away from the stove.

BOILS — FURUNCLE

A boil is a localized inflammation of the skin, excited by pus germs, and favored by exhaustion, depression, and unhygienic surroundings. In a few days the pus forms a core, which sloughs away. Surrounding this is a hardened area of inflammation.

TREATMENT.— For the first day or two apply ice-bags or ice compresses quite continuously, or for two or three hours at a time, and follow with fomentations or hot compresses for ten or fifteen minutes. The following solution is said to abort boils, if applied early, two or three times a day: —

℞ Iodin (metallic) ..... 1 dram
Acetone ..... 2½ drams
M.
Sig.: Paint on the boil, using a camel's-hair brush or a feather.

Or apply an ointment made of the following: —

℞ Ichthyol ..... 1 dram
Mercury ointment ..... 1 dram
Extract of belladonna ..... 1 dram
M.
Sig.: Apply locally, and make pressure with adhesive strips.

If a boil is not aborted by these measures, apply moist heat several times a day. During the intervals, cover with a wet dressing, consisting of several thicknesses of gauze wet with a saturated boric-acid solution or two-per-cent-carbolic acid or lysol. Cover with flannel. Keep it moist. A boil that does not open quickly, should be lanced.

CARBUNCLE

A carbuncle differs from a boil in that it has several points, or heads. It is much larger, and the pain is more

intense. In the aged and in children it is very serious. A carbuncle may involve an area varying in size from a dollar to the palm of the hand. The pain is intensely burning and throbbing in character. A number of openings form, discharging pus streaked with blood. The skin may slough away, leaving a large ulcer. If uninterrupted, a carbuncle points in about ten days, and runs a course of from three to six weeks. This time, however, may be very much lessened by proper treatment. Carbuncles appear on the neck, back, or on the lip. They are more dangerous if on the lip or scalp. They are due to exhaustion, nervous depression, sedentary life, impoverished blood, diabetes, or infection.

Treatment.— At first treat the same as a boil. For the intense burning pains, apply fomentations over a boric-acid compress for thirty minutes three or four times a day. After the carbuncle begins to discharge freely, treat three times a day with alternate very hot and ice-cold compresses for fifteen minutes. During the intervals, protect with the wet dressing described under Boils. Cover with a large piece of flannel, and hold in place by strips of adhesive plaster. The patient is better off in bed, and should eat lightly.

Parasitic Skin Diseases

ITCH

Synonym.— Scabies.

Itch is a contagious skin-disease, caused by the *Acarus scabiei*. The disease is acquired through intimate association with others who have it.

Symptoms.— Intense itching and scratching. The female parasite burrows in the epidermis, selecting areas where the skin is tender, such as between the fingers, on the wrists, breasts, and abdomen. She leaves a well-defined burrow, at times nearly an inch long, which is revealed by little eleva-

tions, blisters, and even pustules. The course is indicated by a dotted line, and usually the scratch marks are parallel with this.

Treatment.— Take a long hot bath, and then apply either one of the following ointments: —

℞ Precipitated sulphur ..... 1 dram
Balsam Peru ..... ½ dram
Lard ..... 1 ounce
M.
Sig.: Rub in thoroughly. Repeat for three days.

Or,—

℞ Balsam of copaiba .....
Liquid styrax ..... equal parts
M.
Sig.: Use twice a day for three days, according to directions.

Use twice a day for three days. Take a warm bath, change all linen, and apply the sulphur ointment again.

The clothes should be boiled.

LOUSINESS

Synonym.— Pediculosis.

Causes.— The female head-louse deposits ova on the hair. These are called nits. A single parasite may deposit more than five thousand in one week. Acquired by contagion from the filthy, on steam-cars, and in cheap boarding-houses. Always goes with uncleanliness. The crab-louse appears on the hair about the genital organs, and gives rise to much discomfort.

Symptoms.— The principal symptom is itching.

Treatment.— Wash the hair with vinegar, lemon-juice, or kerosene oil. Sometimes it is best to cut the hair. Children so afflicted should be kept from school until all traces of the trouble have disappeared.

RINGWORM

Caused by a vegetable parasite. On the scalp it is called *Tinea tonsurans,* and on the body, *Tinea circinata.*

SCALP RINGWORM

Symptoms.— One or more rounded, scaly, grayish-colored areas on the scalp, somewhat elevated, through which project broken-off hairs, which are dry, brittle, and lusterless. As ringworm is very contagious, the other members of the family should be protected.

Treatment.—Wash the scalp with green soap or soft soap and water. The crusts may first be softened with olive-oil. All the broken hairs should be pulled out. Then paint the area with turpentine daily, or with the following: —

℞ Iodin crystals ..... 1 dram
Goose grease ..... 1 ounce
M.
Sig.: Paint ringworm daily.

One of the sulphur ointments already mentioned may be used.

This treatment is applicable to ringworms of the body.

BARBERS' ITCH

A parasitic disease affecting the beard, characterized by little pustules around each hair. The hair is brittle, broken, and loose. Itching is present. This disease is often confused with sycosis.

Treatment.— The hairs must all be pulled out or shaved off. Either operation will be painful. Hot compresses to the face should precede it. Apply hot and cold compresses to the face daily; bathe with the following: —

℞ Sodium hyposulphite ..... 3 drams
Water ..... 3 ounces
M.
Sig.: Apply to the face. (No. 1.)

Then apply the following ointment: —

℞ Sublimed sulphur ..... 2 drams
Ichthyol ..... 2 drams
Vaselin ..... 2 ounces
M.
Sig.: Apply to the face. (No. 2.)

It may be necessary to persist in this treatment several weeks or even a number of months. The face should be shaved until every trace of the disease has disappeared.

LUPUS VULGARIS

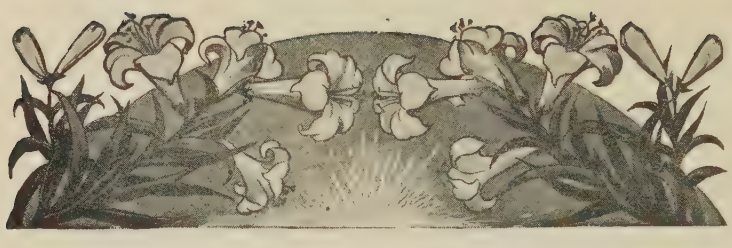
This is a local tuberculosis of the skin. It is more common in women, and during the second and the third decade of life.

Symptoms.— The disease most frequently appears near the nose, first as minute reddish-brown papules, or points, which grow very slowly, and may become nodules, soft, but not painful. These may break down and form ulcers or be absorbed. If ulcers form, they are shallow, with red edges. The prognosis is not very good, though many cases make a complete recovery.

Treatment.— Every effort must be made to improve the general health. The Finsen light is the most successful treatment. Hot and cold sprays should be given, also hot and cold compresses for twenty minutes two or three times a day, with massage applied at the border of the lesion. The direct rays of the sun have been used with gratifying success. The X-ray does not accomplish all that is claimed for it, though by this means the progress of the disease may be stayed. The following ointments have been used with some success: —

℞ Bichlorid of mercury ..... 2 grains
Tincture of benzoin..... 1 ounce
M.
Sig.: Apply with a brush twice daily.

℞ Oxid of zinc ..... 5 drams
Mercury oleate ..... 5 drams
Ichthyol ..... 2 drams
Starch ..... 5 drams
Salicylic acid ..... 80 grains
Vaselin ..... 5 drams
M.
Sig.: Rub in twice daily.



CHAPTER XXXVI

Diseases of Men

INFLAMMATION OF THE BLADDER

SYNONYMS.— Cystitis, catarrh of the bladder.

CAUSES.— Exposure to cold while in a state of perspiration, wetting of the clothing, injury, blows, falls, infectious diseases. The most common cause in men is infection induced by germs caused by gonorrhea or germs carried into the bladder by means of catheters and other instruments. In old men it may follow enlargement of the prostate gland.

SYMPTOMS.— *Acute.*— Difficulty in passing the urine. Intense suffering, due to spasm of the bladder muscles. Even when the bladder is empty, there may be an intolerable pain, due to the desire to urinate. Pain is most severe at close of urination. Frequent urinations. During the intervals of sharp pain, there is a dull, aching pain above the pubes, which is increased by pressure. There may be slight or even high fever. Loss of appetite, great thirst, and distressed countenance are common symptoms. The urine is cloudy, acid, contains mucus, and at times blood.

Chronic.— Follows acute attacks. May follow stricture, stones in the bladder, or large prostate. There is frequent and painful urination, the urine is generally alkaline, and contains pus, blood, mucus, and crystals.

Treatment.— Rest in bed in acute cases, and a thorough protection of the abdomen with a woolen garment in chronic cases. The food should be light and unirritating. Avoid alcohol, tobacco, meats, condiments, spices, asparagus, and eggs. Skimmed milk with a little lime-water is a good diet in acute cases.

Hydriatic.— A daily neutral bath, 98°, for half an hour; the hot sitz bath; hot hip pack with hot foot bath or hot leg pack; fomentations to the pubes and perineum. (See Nos. 174, 172, 177, 171, 176, 170.)

A tea made from uva-ursi (bearberry) leaves is considered beneficial. Use one ounce of the leaves to a pint of boiling water. Drink a cupful three times a day.

Local.— Irrigation of the bladder is nearly always necessary in chronic cases. A fountain or glass bottle syringe and a small rubber catheter are all the apparatus required. The catheter must be absolutely clean; it should be boiled several minutes.

Solutions.— Water at 100°. Salt solution, one teaspoonful of salt to the pint; or equal parts of a saturated boric-acid solution and water; or potassium permanganate, $\frac{1}{1000}$ or seven grains to a quart of water.

The water should be permitted to flow into the bladder slowly, until there is a feeling of fulness. One or two ounces will usually give this feeling. This may be repeated until several ounces have been used. This treatment should be given under a physician's direction.

If there is retention of urine, draw it with a catheter.

SEMINAL EMISSIONS

Emissions of semen are involuntary losses that take place during sleep. Involuntary discharges of seminal fluid take place from time to time in nearly every healthy man. These discharges vary in frequency in different men anywhere from eight days to eight weeks. As to the line where the fre-

quency of seminal evacuations becomes abnormal, and injures the health, no fast and fixed rule can be laid down. Every man is a rule unto himself. What would be considered normal in one individual might be ruinous to the health of another, just as the quantity of food eaten by one man would surfeit and burden another, and result in dyspepsia. It is the general consensus of opinion among the best physicians that losses once in two weeks have no particular influence upon the health. Two or three losses may take place on successive nights, due to the fact that only one seminal vesicle is discharged at a time, or because there is only a partial discharge, for losses differ in quantity. This apparent frequency at one time is very likely to be compensated for by a corresponding absence at another time, or by a prolonged interval of cessation.

That seminal losses have been the common lot of man from time immemorial is clearly evinced by both sacred and other ancient literature. These losses are purely physiological, and are analogous to the corresponding physiological function in woman, namely, the monthly menstruation. In the laws of Moses on purification, these two functions are considered on the same basis, with this difference,—man was unclean only until the even. Lev. 15:25-29. See also Lev. 15:32, 33; 22:4; Deut. 23:10. These references show that nocturnal losses were of frequent occurrence three thousand years ago, and are not a production of modern times.

The seminal fluid is the most highly vitalized secretion of the body, and no doubt sustains a very intimate relation to the nutrition of the nervous system. Just as prolonged menstruation, or menstruations that occur every two or three weeks instead of every four weeks, are weakening, so too frequent seminal loss, either involuntary or in sexual relations, will lay the foundation for disease.

Abnormal nocturnal losses are to be determined by the influence left upon the system. A woman who has a per-

fectly normal period, or who does not even suffer pain, which is a rare condition, is more or less indisposed, lacks ambition, and is languid, but her case is not a morbid condition. Likewise a man who has a prostatic ebb and flow of congestion, a true physiological storm, attended by a seminal loss, may be somewhat indisposed, languid, mentally dull, with a disposition to sleep.

Abnormal seminal emissions, which take place with or without erections or any pleasurable sensation, with the absence of dreams, or, in fact, with the failure to be awakened by the discharge, indicate a condition that may become serious. Such losses are attended by marked exhaustion, headache over the eyes, dizziness, palpitation of the heart, weakness in the knees, and feeling of oppression in the chest.

Hypochondriacs.—Thousands of young men to-day are sexual hypochondriacs, first because of a mental tendency to impurity and to dwell in thought upon sexual matters, and second because they are ignorant of the physiology of the sexual organs. This condition is not confined to men. Exhausted from sexual indulgence, mentally and physically, they pass into a morbid state of mind that makes them ready victims to disease and to the cupidity of conscienceless men.

Such individuals are terrorized by reading advertisements and hysterical circulars, with graphic descriptions of "lost manhood, sexual weakness, impotency, wasted organs, general weakness, specks dancing before the eyes, loss of memory," and an endless array of symptoms.

These sexual perverts are tortured by horrible nightmares, because of supposed losses at stool; or because on close inspection they find the lips of the meatus glued together in the morning; or because, in their fevered imagination, the testicles are smaller than formerly. In their attempt to flee from the wrath to come, they are met with a worse fate, — they fall into the hands of a "specialist," or a charlatan, the parasites and vultures of the medical profession.

Treatment.— A male who is having night losses not oftener than once in two weeks evidently needs no treatment other than mental and moral.

Many may have a loss once in eight days through a long period of years, and not suffer the least in health. Too much of a startling nature has been written on the terrible consequences of seminal losses, even by well-meaning writers, who doubtless had the selling of books more in mind than the benefit of those who would read their hysterical writings.

For frequent nocturnal seminal losses the following suggestions are offered: —

1. Avoid the cause if known, such as impure thoughts, obscene books, self-abuse, quack literature, and any sexual excitement.

2. The diet should be nourishing and wholesome, consisting of fruits, fruit juices, grains, nuts, milk, peas, beans, lentils, and vegetables. The evening meal should be light, and taken at least three or four hours before retiring. Food should be eaten slowly, and thoroughly masticated. Avoid an impoverished diet. Meat, tea, coffee, alcoholic drinks, tobacco, spices, and condiments, even eggs in excess, have a stimulating influence on the sexual organs, by irritating the nerve-centers through the blood, and therefore should not be indulged in.

3. *Exercise.*— A sedentary life and long hours at a desk should be counterbalanced by outdoor exercise, such as walking, swimming, rowing, playing golf, tennis, or any wholesome exercise. Prolonged mental effort and overstudy have a tendency to increase the frequency of emissions. Several hours' study before bedtime congests the brain and excites the nerve-centers; thus the centers in the brain and spinal cord controlling the sexual organs are excited and irritated. Physical exercise just before retiring is important.

4. *Moral.*— The mental attitude of the patient has much to do with his condition. Cultivate a sincere love for truth

and purity, and a firm trust in God. If the mind is pure, it will reflect its influence upon every part of the body. To the despondent and dejected the Bible offers comfort and peace to heart and mind. It alone can satisfy the disturbed spirit.

5. *Hydriatic.*— A plunge into a bath tub of cold water every morning, followed by vigorous friction, or a cold towel rub every morning on rising, with friction. The circulation of the skin may be increased by the use of the flesh-brush. The daily sitz bath, taken at 88°, gradually reduced to 80°, for fifteen minutes, with friction, the feet in hot water at the same time, will contract the pelvic blood-vessels. The shallow bath at 85° to 70° for ten minutes, with friction, will improve the circulation, and relieve the pelvic congestion. This may be taken at bedtime. Especially is this a helpful measure after prolonged mental effort. The injection into the rectum of a pint of water at about 70°, retaining it for fifteen minutes, or passing a stream of cold water into the rectum, with a second tube to return the water, will also relieve the congestion and irritation of the seminal vesicles and prostate gland. This should be continued for fifteen or twenty minutes. A salt rub two or three times a week is another excellent tonic measure. (See No. 190.)

6. *Sleeping.*— When the body or the mind is exhausted from overwork, emissions are more frequent and exhausting. Hence one of the most important conditions in the treatment is to secure abundance of refreshing sleep. The room should be well ventilated, and the temperature not over 60° F. It is a good plan to become accustomed to sleeping on a hard mattress, and with as little covering over the body as is compatible with comfort. Sleep on the side. Sleeping on the back or the adbomen excites the genitals by increasing the quantity of blood in these organs, because of heat produced while in contact with the bed. Various devices have

been suggested in order to prevent one from rolling on his back while asleep. Emissions are more likely to occur during the small hours of the morning; hence it is important to get up once or twice during the night to empty the bladder. A distended bladder irritates the seminal vesicles and the prostatic urethra, and excites contractions.

A man who is accustomed to handling his genital organs frequently during the day, is quite likely to do so while asleep, and by the irritation to produce an erection and an emission. This is much more common than is generally known. In such cases it is well to tie the hands so they can not touch the genitals, or else wear gloves or mittens with brads in them, which will awaken the sleeper if he attempts to rub the genitals.

7. *Local.*— Electricity is found to be a very helpful measure in the treatment of seminal emissions. The faradic and galvanic currents are the two most useful measures. The faradic current is applied by first passing a steel sound into the urethra, while one pole of the battery is applied to the end of this, and the other pole is applied to the abdomen, groin, inner surface of the thighs, the spine, and to the perineum. This should be given eight or ten minutes three times a week. The treatment must be continued for six to eight weeks to be of much benefit. This treatment can be given by a qualified nurse under a physician's direction.

8. *The Bowels.*— It is very important that the bowels be evacuated daily. Constipation aggravates the already existing irritation of the seminal vesicles. A fruit diet is best to keep the bowels in good condition. Prunes, figs, baked apples, apple sauce, oatmeal, coarse Graham or brown bread, or even a little bran, are the best foods for constipation.

9. *Drugs.*— These are rather unsatisfactory. The following are recommended: Potassium bromid, ten to fifteen grains at bedtime; antipyrin, seven grains at bedtime; ex-

tract of belladonna, in pills of one-sixth grain each, one pill to be taken at bedtime, for one week, then increased to two pills for a week; the dose may be increased one pill each week until four pills are taken each night. Continue for one or two weeks, then diminish in the same ratio.

SPERMATORRHŒA

This condition can not be diagnosed, except by the use of the microscope. The bugbear "losses at stool" in the great majority of cases is not semen, but simply prostatic fluids. It would not be at all strange if in straining at stool, a few drops of semen were forced out of charged seminal vesicles. The straining necessary to move a constipated bowel causes a marked contraction of the levator ani muscles, which in turn causes the hardened feces to press against the seminal vesicles and upon the prostate gland, and forces a slight discharge from the penis. The prostate gland and Cowper's glands supply a thin, clear fluid, which may be forced out during defecation. Even nocturnal pollutions may be entirely made up of these fluids, and not contain spermatozoids.

Causes.— Excessive sexual indulgence, masturbation, onanism, continued sexual excitement from any cause, reflex irritation from worms, hemorrhoids, retention of sebum under the foreskin, gonorrhœa, and chronic prostatitis. It may follow some exhausting disease, such as typhoid fever, tuberculosis, and certain nervous disorders.

Treatment.— Same as for Seminal Emissions, page 488.

IMPOTENCY

By this is understood the inability of a male to effect coitus successfully. It is the price a man pays for his excesses. It is nature's way of saving a man from ruin. Any special sense, if used excessively and overstimulated, becomes depressed, and finally paralyzed.

Causes.— Sexual excesses, disease of the testicles, drugs, Bright's disease, diabetes, onanism, mental excitement (especially is this latter the case in sexual neurasthenics), masturbation, and shame.

Treatment.—Abstinence from all sexual excitement, and tonic measures, as suggested under Seminal Emissions.

STERILITY IN THE MALE

Causes.— Lack of seminal fluid, absence of spermatozoids, obstruction of the seminal ducts, gonorrhea, prostatitis, disease of the testicles, phimosis, injuries to the perineum, and mental influences.

Treatment.— If due to organic changes, it can not be helped.

GONORRHEA

The great prevalence of this disease, its terrible consequences, and the general ignorance of the common people concerning it, lead the writer to consider it, that, perchance, some may be saved from physical ruin, or a life of misery.

It is alarming to see the growing frequency of this disease among all classes, and especially among the lower classes of society in the large cities. Not only is it increasing among men and women, but it is becoming so common among boys and girls under puberty, that some of the leading physicians begin to feel the need of measures to stay the progress of the disease.

It is claimed that ninety per cent of all pelvic diseases in women are due to gonorrhea. While this estimate is no doubt high, there can be no question that thousands of women, innocent of their trouble, are lifelong sufferers because of having been infected with this disease.

Thousands of blind children crowd our asylums to-day whose blindness is due largely to gonorrheal infection of the

eye while they were but a few days old, contracted in their passage through an infected birth canal.

The disease is so virulent and contagious that if the infection is conveyed into the eye, the sight may be totally destroyed in twenty-four hours. Infection may be conveyed by towels, or by drinking at public places, or using public closets. In speaking of gonorrhea Dr. Hyde says: "Of all diseases, gonorrhea is the most correctly termed venereal, for it is the most frequently acquired from sexual intercourse, and is rarely acquired in any other way."

Its ravages are appalling. Organic heart-disease, chronic joint diseases, swellings, destruction of the bones, and invasions of other organs, commonly follow gonorrhea.

The disease was common in the days when Rome flourished, and her society was rotten to the core. To-day it is even more common in China, Japan, and India than in more advanced nations. Even the islands of the sea have not escaped.

The young man who feels the need of sowing his wild oats, and contracts this disease because of cohabitation with a prostitute, is not worthy of the pure love of a true woman, and has no right to marry and inflict his disease upon an innocent person, with the possibility of ruining her health for life.

Symptoms.— The period of incubation is from one to seven days, more often twenty-four hours. There is sticking together of the lips of the meatus; stinging and pricking sensation on urinating, which in the course of a few days becomes exceedingly painful and distressing; and a discharge of pus from the urethra, which gives a greenish-yellow stain. It must ever be borne in mind that this pus is exceedingly infectious.

The irritation in the urethra causes increased sexual desire, and erections, which give rise to excruciating pain. Painful erections are more likely to come on at night, being

influenced by the warm bed. The lymphatic glands in the groins are enlarged. The severe symptoms continue for two or three weeks. The discharge of pus may continue for six or eight weeks or even longer.

Complications.— Abscess of the urethra, inflammation of the head of the penis and foreskin, constriction of the foreskin in front of the glans penis (phimosis), or a constriction behind the glans (paraphimosis), urethral fistula, inflammation of the prostate gland, inflammation of the testicle, with complete destruction of that organ, inflammation of the bladder, which may extend up the ureters into the kidney; the germs carried by the blood may cause inflammation of a joint, or organic heart-disease; and strictures of the urethra, followed by what is called gleet, or a clear discharge. Organic nervous diseases at times follow gonorrhea.

Treatment.—Rest in bed. This is essential, but seldom carried out; and as a result, complications set in. If the diet consisted of nothing but bread and water, the patient would be better off. Tobacco, liquor drinking, tea, coffee, meat, eggs, and all condiments must be avoided. The bowels should be moved daily by a hot enema, and kept in a good condition by eating prunes, apples, and other laxative fruits. Skimmed milk is a good diet. All highly seasoned food must be avoided. Water, or carbonated water, should be taken in copious drafts. Lemonade is excellent. There must be no sexual excitement.

Hydriatic.— Hot sitz bath two or three times a day; hot enema, 110°, two or three times a day; immersing the penis in hot water frequently while urinating, followed by ice compresses, renewed every ten minutes, for two hours at a time. (See Nos. 172, 195, 186.)

Injections.— The front part of the urethra may be irrigated with water as hot as can be tolerated, beginning at 114°. In this treatment a very small catheter may be passed

three or four inches into the urethra, and a fountain syringe attached. The water will return around the sides of the catheter. For self-treatment a small glass urethral syringe should be procured, and injections made into the urethra several times a day. This treatment taken in conjunction with that prescribed by the attending physician will hasten a cure.

Solutions.— Argyrol, ten-per-cent solution; protargol, two-per-cent solution; peroxid of hydrogen, one part in six parts of water, followed with the protargol solution or by potassium permanganate solution, beginning with $\frac{1}{1000}$ and increasing to $\frac{1}{500}$. Injections may be necessary for several weeks. Do not consult a druggist for a solution for injection. Avoid all such.

INFLAMMATION OF THE TESTICLE

Synonym.— Orchitis.

Causes.— Injuries, such as falls, kicks, bicycle riding, horseback riding, tuberculosis, infection from the urethra.

Symptoms.— Severe aching pain, swelling, great tenderness to the touch, throbbing, redness, local and general increase of temperature, headache, loss of appetite, discomfort increased by any movement, dragging sensation and feeling of weight if in the standing or sitting position.

Treatment.— Rest in bed, lying on the back, with the legs together, so as to support the testicle. Fruit diet, with toasted breads, or a milk diet exclusively. Avoid alcohol, meat, tea, coffee, eggs, butter, pastries, and any rich food. Move the bowels with a warm enema. Cold friction three times a day. Locally apply compresses wrung out of water at 60°, changing every few minutes, for two hours at a time, alternating with very hot compresses for fifteen to twenty minutes every two hours. It may be necessary to continue this treatment almost continuously for several days. (See Nos. 195, 184, 186.) It is a good plan to wear a suspensory for a short time. Do not get up too soon.

VARICOCELE

This is an enlargement of the veins of the scrotum, often on the left side. The enlargement is more often present in young men.

Causes.— Increased blood-pressure and other circulatory disturbances.

Symptoms.— A dull aching in the testicle, shooting pains, and, worst of all, much worry and anxiety. The veins of the spermatic cord may enlarge so as to form a large mass in the scrotum, much larger than the testicle.

Treatment.— Wear a suspensory bandage, obtained at any drug-store, or what is more satisfactory, undergo a slight operation for the removal of a portion of the enlarged veins.

HYDROCELE

This is a collection of fluids in the scrotum, often causing it to become larger than the fist. Neither varicocele nor hydrocele is a condition that any man should worry about, but it is best to remove the cause.

The treatment consists in drawing off the water through a trocar, or removing the sac that contains the water.

HERNIA

Synonym.— Rupture. This is a condition very common in boys and men. It is due to a weakening of the abdominal wall, so that a loop of the intestine partly or completely passes into the scrotum. The greatest weakness is at the point where the spermatic cord passes out through the abdominal wall. Many children have congenital hernia. A large proportion of these entirely recover without an operation.

Causes.— The most common causes of hernia are straining, lifting heavy loads, jumping, and the weakening of the abdominal muscles in old age.

A reducible hernia is one in which the intestine can be easily pushed back with the fingers, or where it goes back of itself, upon lying down. Coughing, sneezing, blowing the nose, vomiting, or straining at stool, will bring the gut down into the sac.

An irreducible hernia is one that can not be replaced by gentle manipulation. Violent straining, coughing, or sneezing may force a knuckle of the intestine through a small opening, or ring, and be so constricted by the neck of the sac that the intestine can not be returned. This is called an incarcerated hernia. It is a very serious and dangerous condition, and a physician should be called at once. The patient suffers intense pain in the abdomen, and there is nausea and vomiting. The abdomen becomes distended, and the patient is unable to pass either gas or feces. Finally, there is fecal vomiting. If no relief is given, death soon follows.

In women, femoral hernia, where the swelling appears just a little below the groin, is the most common form. A rupture at the navel is also common in fleshly women.

Many mothers are often alarmed, thinking their babies may have a rupture at the navel because of hard and prolonged crying. This seldom happens, and if it does, the rupture will disappear in time.

Treatment.— In infants and children a rupture will often entirely disappear without any treatment, particularly if a properly fitting truss is applied. If, after sufficient time, a hernia is not cured by a truss, an operation should be had. It is an injustice to a child to expect him to wear a truss all the rest of his life.

In an adult a properly fitting truss usually affords relief and safety. This should fit so as to remain in place, whatever position the patient assumes, and should be removed before retiring. After a patient becomes accustomed to a truss, it should not cause pain or irritation of the skin.

In very young children a truss may be made by padding and covering a large button, and holding it in place with two or three bands, sufficiently wide not to cut into the flesh.

With every rupture of any extent, there is always a marked element of danger. A strangulated hernia is always a possibility, is of frequent occurrence, and is likely to happen at the most inopportune time. For this reason the safest and most reasonable advice to offer to a patient having a rupture, is to recommend a cure by means of a surgical operation. In the majority of cases, this offers permanent relief by removing the cause of the hernia. This operation is attended with very little danger.

In case of irreducible hernia, a physician should be called without delay. Sometimes a hernia can be reduced by drawing the knee up toward the body, and then exercising gentle but firm pressure over the rupture, pressing upward. This may be greatly helped by having the patient sit in a tub of hot water during the manipulation. No force should be exercised. Reduction is indicated by a gurgling sound and a disappearance of the swelling.



CHAPTER XXXVII

The Care of Children

According to reliable statistics, nearly ten per cent of all infants die during the first month of life. The greatest mortality occurs during the first year. The most common causes of death during the first year are debility, intestinal diseases, whooping-cough, convulsions, measles, and pneumonia.

Drugs.— The least important part of the treatment of children is drug-giving. Attention to hygiene, proper feeding, clothing, ventilation, good nursing, are far more vital matters than the giving of medicines. A sick child's stomach is very sensitive, and is easily disturbed by medicines. In the large majority of acute cases, children promptly recover without medication. It is well to remember also that children respond quickly to local measures.

Bathing.— Until the cord comes off, bathe with a washcloth, water 100°, in a warm room; avoid irritating soap, and always rinse before drying. Give a daily bath. A bath tub is not a necessity, but a great convenience. The first six months bathe in water at 98°, making it a little colder at the finish. After six months, lower one degree a month to 90°, and always cool quickly at the end of the bath. After the second year, give the child a quick rub at 80°, and dry with considerable friction. As a rule children enjoy the cold, and it is better for them.

The Weight.— The average child at birth weighs about seven and one-half pounds. After the first week a child should gain from a quarter to a half pound a week for six months; after that the gain is slower. In five months the baby should double its weight, or weigh about fifteen pounds; in one year it should weigh about twenty-one pounds. An infant should be weighed frequently, if there is any doubt about its food. The fact that a baby is fat is no indication that it is healthy. Fat babies are much more susceptible than others to croup and other diseases.

Clothing.— Very soft flannel makes the warmest and most comfortable garments for a baby. Until the baby is able to sit up, which is not for several months, dress it lying on the lap, and pull the clothes over its feet, not over its head. The clothes should be neither too loose nor too tight. The legs should have free movement. Do not have buttons or large safety-pins on the back, or anywhere to press into the flesh. The belly-band may be worn for three or four months, though it is not necessary. As a rule, babies are overdressed, and have too much over them when asleep.



Feeding.— Until the milk appears in the breast, about forty-eight hours, the baby should be nursed once every four hours. After that nurse regularly every two and one-half hours during the day and twice at night. In case the baby is very strong and healthy, and the mother's milk is delayed in coming, it may be best to supplement the nursing with other food until the mother's supply is sufficient. For this purpose, give one teaspoonful of cream with seven of warm water. Avoid all kinds of teas. Babies should have warm water frequently. After six weeks nurse once in three

hours. Most babies are nursed too frequently and are overfed. I have examined many children who had a marked dilatation of the stomach, unquestionably due to this cause. After three months a baby does not require nursing between 10 P. M. and 6 A. M. Have a regular time for nursing. If the baby cries half an hour before the nursing time, give a few teaspoonfuls of warm water. Babies often cry because of thirst. At nine months a child does not require more than four feedings a day, and after the first year, three meals are sufficient. After the sixth month it is a safe and good plan to give the baby one or two teaspoonfuls of sweet orange juice twice a day midway between feedings. At nine months more juice may be given, or scraped apple, baked apple, or prune marmalade. During the second year children should receive the juice of half a sweet orange twice a day. Give at about 10 A. M. and 4 P. M. This will take the place of eating between meals, and is much more wholesome for the child. Scraped apple may be given in place of the orange. Lemonade with a moderate amount of sugar may also be given. A nursing baby should be kept at the breast fifteen or twenty minutes, and as a rule one breast is sufficient. Do not allow the baby to doze or sleep at the nipple. It is a bad habit.

The mother should eat an abundance of nourishing food, — cereals, nuts, milk, butter, peas, beans, lentils, vegetables, and fruits. Avoid tea, coffee, beer, and all alcoholic drinks. Nursing women need not deny themselves fruit. Any food that agrees with the mother will agree with the child. Worry, fatigue, excitement, or passion excite the child, and may cause colic.

If the child must be fed artificially, modified cow's milk is the best food. Many of the prepared infants' foods on the market are wholly unfit to be given to young children. Especially is this true of malted cereal foods and condensed milk. Scurvy and rickets are very frequent among infants

fed on such foods. If cow's milk is properly modified, there are very few babies that will not thrive on it. If it does not agree with the child, it needs further modification. With a little care the right proportions can be found, so that the child will begin to grow and do well.

Cow's milk contains much more proteid, or curd, than human milk, hence it must be diluted; but it contains less sugar, and so some sugar must be added.

From the first to the sixth week, add four parts of water to one part of milk; during the next six weeks, three parts water; during the next six weeks, two; then, up to the age of nine months, use equal parts of milk and water; after that no diluting is necessary; the baby can take pure milk. Boiled water is the best dilutent.

At birth a baby's stomach holds about one ounce, or two tablespoonfuls, and it increases one ounce in capacity each month for six months. At the end of four weeks the baby may be given four tablespoonfuls of food at a meal. For sweetening the milk, use brown sugar. Always use fresh milk, and get it from several cows instead of one. Milk that is near the souring point is a prolific cause of bowel trouble among artificially fed children. Unless favored with ice and a good refrigerator, prepare each meal at the time needed. A bottle may be used, but feeding with a spoon is better. It is no trouble to keep a spoon and a granite dish clean. In the end this mode of feeding will save time. If a bottle is used, get a Hygeia.

If possible, milk should be obtained both morning and evening, to insure freshness. Place in a tall bottle or jar, and allow to stand four or five hours in a cool place. The top cream will contain about twelve per cent of fat.

In order to simplify matters, and make it as easy as possible to modify cow's milk, a number of formulas are subjoined, which it is usually safe to follow. The amount is for one feeding.

First to Fourth Day: —

Top cream	1 teaspoonful
Boiled water	7 teaspoonfuls

Fifth Day to End of Second Week: —

Top cream	2 teaspoonfuls
Milk	½ teaspoonful
Lime-water	½ teaspoonful
Brown sugar	35 grains
Boiled water	2 tablespoonfuls

Buy brown sugar; and, in order to obtain a correct measure of the amount required for each feeding, have a druggist weigh out the exact quantity; put it into a teaspoon, and use the amount thus given as a sample measure.

This food should be warmed to a temperature of 100°, and kept there while the baby eats. Frequent warming may be necessary by dipping the bottle into warm water, or by setting the dish into warm water.

Third and Fourth Weeks: —

Top cream	3 teaspoonfuls
Milk	1 teaspoonful
Lime-water	½ teaspoonful
Brown sugar	nearly 1 teaspoonful
Boiled water	3 to 4 tablespoonfuls

Second Month: —

Top cream	1 to 1½ tablespoonfuls
Milk	2 teaspoonfuls
Lime-water	nearly 1 teaspoonful
Brown sugar	1 teaspoonful
Boiled water	4 to 5 tablespoonfuls

Third and Fourth Months (feed every three hours): —

Top cream	1½ to 2 tablespoonfuls
Milk	2 to 3 teaspoonfuls
Lime-water	1 teaspoonful
Brown sugar	100 grains (1½ teaspoonfuls)
Boiled water	5 to 6 tablespoonfuls

Fifth Month (feed every three and one-half hours): —

Top cream	2½ tablespoonfuls
Milk	1 tablespoonful
Lime-water	1 large teaspoonful
Brown sugar	144 grains (about 2 teaspoonfuls)
Boiled water	6 tablespoonfuls

Sixth to Tenth Month: —

Top cream	3 to 4 tablespoonfuls
Milk	1½ to 2 tablespoonfuls
Lime-water	1½ teaspoonfuls
Brown sugar	175 grains (about 2½ teaspoonfuls)
Boiled water	7 to 10 tablespoonfuls

If a child is doing well, after the sixth or seventh month a little oatmeal or barley-water may be substituted for part of the water in the foregoing formulas. No starch should be given before the sixth month. Make the increase from month to month gradual.

If the child's digestion is feeble, the percentages given may have to be reduced, and greater intervals allowed between the feedings. A healthy baby with good digestion may have the quantities increased more rapidly than specified.

In changing the baby's food to modified cow's milk, begin with the weaker dilution first, and gradually increase the strength as the child's digestive organs become accustomed to the new diet. As a rule, it is not wise to make any sudden change in an infant's diet.

In feeding babies modified cow's milk, bear the following points in mind: —

Curds in the stools, and colic, indicate too much raw milk (proteid); hence it may be necessary to reduce this for a time, and then gradually increase it again.

Sour stools indicate too much sugar, and possibly too much fat. Reduce if necessary.

Very offensive and white stools indicate too much fat or cream.

Vomiting immediately after feeding indicates too much food, too tight bands, or that the child is moved too much.

Vomiting one or two hours after feeding, and of a sour, curded milk or watery fluid, indicates too much fat in the milk.

If the child does not seem to be satisfied with its meal, first increase the quantity and then the strength of the food.

It is a great injury to the child to change its food every few days.

Colic.— This is one of the great trials of babyhood. It is not likely to continue after the third month. Colic is due to indigestion, and to an excess of curd or proteid in the milk. It may also be caused by worry, fatigue, and an improper diet, on the part of the mother. Cold feet or catching cold will also cause colic. It is best relieved by giving quite warm water from a bottle or with a spoon, and elevating the head. This will often enable the gas to pass up from the stomach. Placing hot flannels over the bowels, or laying the child face down over a hot-water bag, will give relief. Often an enema at 102°, using a No. 15 rubber catheter in place of a hard rubber or glass tube, will relieve the pain. The catheter should be inserted from eight to twelve inches, while the water is flowing.

Catnip tea and oil of peppermint are old-fashioned remedies for colic, and at times seem to be very successful. But there are other times when, in spite of all that can be done, baby will regularly have the colic in the small hours of the morning, when sleep is so sweet, and the house is cold. Do not be discouraged, however, for a baby does not die from colic, and time will be a remedy, if nothing else is.

Weaning.— This should take place about the ninth month. It may be done in a few days by substituting one meal a day for the breast, then two, etc. At times it is best to wean more gradually. It is a mistake for mothers to nurse their babies from fifteen to eighteen months. There are very few

conditions in which it is necessary for a mother to nurse her child more than a year. As a rule, the child is not benefited, and very often the mother is exhausted by nursing a child far along into its second year. It is well not to wean during the hot months of summer unless necessary. At first, rich cow's milk should be diluted about one half with water; after the first week, with one third water; after the second week, plain milk may be given, or a thin gruel may be made from milk, granose flakes, or other cereals.

Sleep.— At first a baby sleeps most of the time. Up to two years of age a child should sleep from twelve to fourteen hours a day. Indigestion or overfeeding causes a child to be restless during sleep. Children should always be put to sleep in a dark room, and without rocking. The poorest time to play with a child is just before bedtime. After the second year, the child should take a good nap once a day; and this should be continued until the fifth or sixth year, at least. Children would be much less nervous if they retired early, and took a nap at a regular time every day.



Crying.— It is perfectly natural for a baby to cry hard once or twice a day. A good, lusty cry is excellent exercise for the lungs, and stimulates the circulation. A healthy cry is strong and loud. Prolonged crying ususally degenerates into a faint moaning. Crying due to pain is sudden, explosive, and stops short when the pain ceases. Crying due to temper is loud; there is stiffening of the body; the head is thrown back, and the face is red. In colic the crying is severe, the legs are drawn up, and the feet may be rubbed together. Crying due to earache is loud, and the little hands strike about the ears. Hunger causes a fretful cry. Habit

and indulgence are very common causes of crying. In such cases the baby will always stop crying as soon as gratified. Babies may cry because of cold feet, tight bands, thirst, lying too long in one position, or from heat due to overdressing.

When a child cries from temper or from overindulgence, the best way to break the habit is to let it have its cry out. It may take one or two hours, but in two or three days the habit is broken. Parents must be firm in such discipline.

The Bowels.— A normal infant has about four movements a day for the first few days, later only two, and in a few months only one. The movement is usually soft and light yellow in color. Green stools indicate indigestion in the small intestine; so also do curds in the stools. In such cases dilute the milk.



For constipation give an enema of warm water, using a small rectal tube, or a No. 15 rubber catheter well lubricated. Protect the lap with papers or oilcloth, and hold the child over a chamber or a slop-jar. Introducing a small cone-shaped soap suppository into the rectum will usually cause a movement. After seven or eight months, a few teaspoonfuls of orange juice will cause a movement, often within half an hour.

In severe acute diarrhea give a good dose of castor-oil. Omit one or two meals, giving barley-water or rice-water instead. For a child up to six months old, give one teaspoonful of castor-oil; for one from six months to one year, give two teaspoonfuls; for a child of two years, give a dessertspoonful.

Teething.— The two lower front teeth appear first, between the fifth and the ninth month. Next come the two

upper front teeth, then the two lateral upper front teeth, then the lower lateral front teeth. The four front double teeth come between the twelfth and eighteenth months. The canine teeth are cut between the eighteenth and the twenty-fourth month. These give the most trouble. The upper are called eye-teeth, and the lower, stomach-teeth.

When the gums are hot and swollen, give sips of cold water, and rub the gums gently with a cloth wrung out of ice-water. Firm pressure for a few minutes will relieve the pain. Do not have the gum lanced, for this is seldom necessary, and the results are usually disappointing. The twenty milk teeth are all usually cut by the thirtieth month.

Miscellaneous.— Tears and sweat appear in from four to six weeks. A baby can hold its head up by the third or fourth month, sit up at seven months, can bear the weight upon the feet at ten months, and walk during the twelfth or thirteenth month. This is the average. Variations may occur in either direction without being necessarily abnormal. Never urge a child to walk. Talking begins at the end of the first year. Short sentences are formed during the latter half of the second year.

Habit.— The training given to a child during its early years will, to a large extent, determine its character. Early impressions are the most lasting. An infant two days old may be forming either a good or a bad habit. A child that is taken up whenever it cries is trained into a bad habit; the same principle is true in reference to nursing a baby to stop its crying. Both these habits cultivate self-indulgence and a lack of self-control, which are manifested in more and varied ways as the weeks and months and years pass by. Because of neglect to train their children properly, a large proportion of parents are slaves to their children, and are ruled instead of ruling.

Self-control is the basic principle of character formation; and if it is neglected during the early and susceptible years

of life, the child suffers an irreparable loss. The Scriptural injunction, "Train up a child in the way he should go: and when he is old, he will not depart from it," is more applicable to-day than ever before. Fortunate, indeed, is the child that receives a training "in the way he should go." It is perfectly evident that he should not go one-sided. The training, to be complete, must be physical, mental, spiritual.

The first training must be the physical. The first habits formed are based upon physical conditions. Later comes the mental training, when more habits are formed; still later, the spiritual training, and more fixed habits. The mental and spiritual natures have their dawn much earlier than is generally supposed; hence this threefold education must begin in infancy.

Temperance is self-control, and this training must begin with the first day of life. With this as a beginning, all other principles of true child-training are closely correlated.



CHAPTER XXXVIII

Accidents, Emergencies, and Various Affections

FELON

This is an inflammation of the end of the finger, due to the entrance of germs through a wound, a crack in the skin, an abrasion, a sliver, or hangnails. In a few days pus forms. If the felon is superficial, it runs a short course; if it is deep-seated, it soon involves the end of the bone, accompanied by intense throbbing pain, and even fever. The end of the bone is destroyed.

Treatment.— As soon as inflammation is noticed, hold the finger in ice-water half an hour at a time, or even longer, repeating the treatment frequently. It is claimed that introducing the finger into the end of an egg, holding it in place with a bandage, will abort a felon. Cut a small piece from the end of a lemon, introduce the finger deeply into the pulp, and surround the lemon with a moist bandage. This will give most excellent results. If the inflammation continues after the third day in spite of this treatment, use hot water or fomentations, and have the finger deeply lanced. After a felon has been lanced, and pus begins to discharge, wash it out daily with peroxid of hydrogen, one part to four parts of water, or with a saturated boric-acid solution. Dress with surgeon's gauze, or with clean, soft cotton strips.

Inflammation starting on the toes, due to ingrowing nails, or to hangnails, should be given the cold treatment at once. Hold in cold water for an hour, then wrap about the foot a towel wrung out of ice-water, and cover with a flannel, changing the towels as fast as they become warm. This will check the inflammation.

SPRAINS

A sprain is an injury to a joint, due to twisting or wrenching of the ligaments. The ankle and the wrist are most commonly involved. The pain of a sprain is intense; swelling soon takes place; and if there is hemorrhage into the tissues, the part will be discolored in a few days.

Treatment.— Immediate rest to the injured part. Place in very hot water for fifteen minutes; then surround with ice-cold compresses, changing every few minutes for one or two hours. Repeat three or four times a day for two days. During the interval, cover with a cold compress and heavy flannel. If the foot, elevate on pillows. It may be held in the right position by means of sand-bags. If the sprain is very severe, the injured ankle or wrist may be placed in a plaster cast. However, massage and hot and cold compresses are just as effective, and the process of healing is hastened by their use. The leg or arm above the sprain should be rubbed and kneaded, always manipulating toward the body, and gradually approaching the sprain, which should be very gently rubbed. Skilful massage to a sprain may entirely relieve it of pain after an hour's treatment. This treatment should be repeated daily for three or four weeks.

FRACTURES

Treatment.— A physician is nearly always available in such accidents. However, much can be done while waiting, or in his absence. Large fomentations for from fifteen to

thirty minutes will best relieve the pain. The ice-bag or cold compresses will check the swelling. Until help arrives, place the patient in as comfortable a position as possible. Make traction by pulling on the extremities of the broken bone, and make direct pressure over the seat of fracture with the thumbs, in order to bring the ends together. Improvise a splint by using thin pieces of board, or a cane, or an umbrella. Place on one or both sides of the fracture, but do not bind too tightly. If boards are used, cover with cotton or cloths to prevent bruising the tissues.

If the patient is advanced in years, and the fracture is in the thigh bone, place in bed, have the limbs near together, hold in place with sand-bags, or bran-bags, and elevate the foot of the bed about six inches. Traction may be made on the leg by suspending a weight of a few pounds (ten pounds) over the foot of the bed. Bricks, stones, or flat-irons may be used, and the weight slightly increased from day to day. A bone that is not well set will shorten. This is likely to be the case under the best of circumstances if in the hip joint. Fractures of the elbow may result in deformity. It takes from three to six weeks for a fractured bone to unite.

DISLOCATIONS

Treatment.— These must be reduced by traction, pulling, and rotation, and then held in place by suitable bandages. In either fractures or dislocations, reduction is favored by fomentations, as heat will relax the muscles. In dislocations the process of repair is greatly facilitated by daily massage directly to the joint. For the first ten days the movements should be rubbing and kneading. Stimulate circulation in the joint by hot and cold applications fifteen minutes once or twice a day, and cold friction to the entire limb. Passive rotary movements should be gradually given to the joint.

BRUISES

TREATMENT.— If a bruise is large or extensive, rest is most essential in the treatment. In a bruise the sensitiveness and vitality of the injured tissues are always reduced, hence great care must be exercised not to apply too hot or too cold applications.

The pain and swelling of a bruise are best relieved by applying fomentations fifteen to twenty minutes several times a day, following with cold compresses, 60°, changing frequently at first, later at longer intervals, and protecting well with two or three layers of flannel. (See Nos. 170, 186.) A bruise is greatly benefited by massage, or by rubbing and kneading. The value of such applications as tincture of arnica, witch-hazel, and camphor depends more upon the rubbing incident to applying, and the cooling influence of the alcohol which they all contain, than to the special medicine.

BURNS

A burn may vary in degree from a slight irritation of the skin, as in sunburn, to a marked destruction of the tissue. A burn involving one third of the surface of the skin of the body, is a very serious matter. Severe burns of a lesser degree are often attended with profound shock. Death may result from shock or from internal congestion. A severe burn over the abdomen may cause gastric or intestinal ulcers because of the reflex irritation. A scald is usually the most extensive form of burn. Burns from flames, fire, or hot metal cause singeing of the surrounding hair. Deep burns cause marked deformity in the process of healing, because of the contraction of the tissues in scar formation.

TREATMENT.— Ice-water is the most acceptable first treatment for a burn, whether small or large in extent. When the skin is broken, an antiseptic compress, such as saturated

boric-acid, should cover the burn; ice-cold compresses should be applied over the antiseptic compress.

Bicarbonate of soda (baking-soda) may prevent blistering if applied at once. It should be put on dry or in a thick paste. A solution will do no good. Cover with a cloth.

The best solution to apply to a burn, especially a large burn, is the following: —

℞ Picric acid ..... 2 drams
Alcohol ..... 1½ ounce
Water to make a pint
M.
Sig.: Apply on cloths or on absorbent cotton.

Saturate compresses with this and cover the burn. Keep the dressing moist. This will stain all garments yellow, and it is exceedingly bitter. It is antiseptic, and relieves pain. The picric-acid dressing may be covered with cotton, or cold compresses may be applied over it for the first day.

A burn may be covered at once with carron-oil,— a liniment of equal parts of lime-water and linseed-oil,— and protected by layers of cotton or gauze. This is a very old remedy.

Blisters should be punctured with a needle at their most dependent part, to allow the serum to escape. Do not remove the skin over a blister, nor pull shreds of skin from a severe burn. If necessary, cut away the clothing. After a severe burn, be sure to keep the feet warm; fomentations to the spine may be needed. Give hot drinks, or a cup of hot coffee for shock. Keep the patient well covered, and out of all drafts.

A burn must not be dressed more often than is absolutely necessary. Dressings saturated with serum should be removed.

When a large surface is involved by a burn, such as the trunk, an arm, or a leg, the continuous neutral bath at 98° has given excellent results. Patients have spent months in

a bath of this nature, while the burn was healing. All irritation is removed by this means. Skin-grafting may be required in cases of extreme burns.

Small but deep and painful burns may be dressed with the following ointment: —

℞ Extract of belladonna ..... 10 grains
Ichthyol ..... 1 dram
Vaselin sufficient to make ..... 1 ounce
M.
Sig.: Apply locally on a gauze dressing.

If a burn is deep, and heals slowly, use on it for a time the balsam of Peru. This will stimulate granulation. It should be applied freely.

FAINTING

Place the patient on the back at once. Do not lift the head up, or try to make a fainting person sit or stand. It is best to have the head lower than the body. Loosen the garments about the neck and chest. Dash a little cold water into the face, or strike the face with a cold wet cloth. Open the windows for a moment. Hold ammonia-water to the nose. As soon as a fainting person becomes conscious, give a teaspoonful of the spirits of ammonia, or some hot drink, and let him remain quiet for a few minutes, or even a few hours.

If the fainting person does not regain consciousness in a few seconds, apply hot and cold over the heart, and rub the arms and legs.

When there is a tendency to faint, let the patient sip cold water, and see that the head is lowered at once.

ASPHYXIATION, OR GAS SUFFOCATION

Treatment.— Open the windows, remove the patient's clothing, and stimulate the breathing by repeatedly striking

the chest with the end of a cold wet towel, or spatting the chest rapidly with the hands dipped into cold water or ice-water. Use artificial respiration and cold friction once or twice an hour, with heat to the spine. (See No. 184.) Oxygen inhalation is good. The principle of treatment in this condition is to stimulate breathing, and increase the flow of blood through the lungs. This is best done by cold friction.

DROWNING

1. As soon as a person is removed from the water, place a garment under him in the boat or on the shore, turn him on his face, stand astride of him facing his head, grasp the body at the waist, lift up a foot or eighteen inches, and then give a quick jerk. The object of this is to dislodge as much water as possible from the lungs. It might be well to bear in mind that a person in the act of drowning swallows large quantities of water, but no water enters the lungs until he has become unconscious.

2. Turn him quickly on his back. Have one person stand above his head, and, grasping both arms at the elbow, lift them, not too rapidly, above the shoulders; as they are raised, a second person, with his hands just above the waist-line, should lift the body a few inches; as the arms are lowered, he should press the lower ribs quite firmly. This movement should be repeated eighteen times a minute. Watch the tongue, to see that it does not drop back into the throat. Turn the patient on the side every few minutes, to permit the water to run out of the mouth. Other persons may rub the arms and legs, or apply hot blankets to the extremities.

If signs of life do not appear in a few minutes, do not become discouraged. Persons who have been in the water more than half an hour have been resuscitated, after one or two hours of persistent and uninterrupted effort.

POISONOUS BITES

These may result from poisonous snakes, from insects, from dogs, or from other animals. Death from snake bite is very infrequent in the United States. A history of traders west of the Mississippi River, at a time when certain sections were infested with large rattlesnakes, gives reports from many old hunters, who state that they never knew a snake bite to prove fatal. In some fatal cases, judging from the treatment given, it would be as reasonable to say that death was due to the treatment fully as much as to the snake bite.

TREATMENT.— *Snake Bite.*— If on the extremities, tie a cord, bandage, suspender, or handkerchief tightly above the wound; twist with a stick if necessary. Suck the wound, or have some other person do so, to draw out the poison. Any one having a sore mouth should not do this. The best antidote for snake poison or for a dog bite is potassium permanganate. A crystal of this should be introduced directly into the wound, and hypodermic injections of one grain in solution should be made about the wound. This destroys the poison by rapid oxidation. This treatment is painful, but efficient. It is well to loosen the bandage above the wound slightly at intervals, to let the poison enter the circulation a little at a time. In this way the poison is best tolerated. Lancing a snake bite wound, so it bleeds freely, will facilitate sucking out the poison. Ammonia-water or a mud poultice may be applied with good results. Never apply an acid to a snake bite or to insect bites; the poison in such cases is usually acid, hence an alkali should be used. Later apply cold to the wound, give hot and cold applications to the spine and over the heart, and give artificial respiration if the patient becomes unconscious, or breathing is suspended. It can not be proved that whisky or brandy ever saved any one bitten by a poisonous snake.

The people of many savage tribes, when bitten by poisonous snakes, kill the snake if possible, cut out the liver, and eat a little of it at once. If they can do this, it is said that death never results. Possibly this may have some physiological backing.

Poisonous Insects.— Such bites rarely prove fatal, but they are painful, and may make one very ill. Treatment differs little from that given under Snake Bite. For stings from bees, wasps, and hornets, as well as from spiders, tarantulas, and scorpions, the immediate application of ice, the ice-bag, or cold compresses will best relieve the pain and inflammation; or the affected part may be held under running water. Fomentations, and bathing with a hot soda solution, two teaspoonfuls to the pint of water, will give relief. Free hot and cold water drinking will tend to dilute the poisons, and thus hasten their elimination.

BLOOD-POISONING

Blood-poisoning following childbirth has already been considered. Blood-poisoning due to the entrance of germs and their poisons into the blood or the lymphatics, is most likely to occur when a person has overworked, is exhausted, run down, or is in a state of lowered vitality, nervous depression, or alcoholism. In a majority of cases the infection takes place on the hands or the feet.

Treatment.— During the first few hours of the infection, apply cold to the inflamed part. Immerse in cold water, use cold compresses, or the ice-bag. Then, if the infection is on the hand, tie an ice-bag across the inner side of the arm near the shoulder; if on the foot, apply it in the groin. Very cold compresses, frequently changed, may be used in place of the ice-bag. (See Nos. 186, 199.) This contracts all the arteries going to the inflamed part. Place the leg or forearm in water at 110° to 115° for

twenty minutes three or four times a day, and during the intervals immerse the leg or arm in boiled water at 98° saturated with boric acid. If a free incision has been made, use, instead of water, a saturated solution of boric acid, or a two-per-cent solution of carbolic acid or lysol.

When the infection is severe, the patient should in addition have fomentations to the spine ten minutes, and cold friction, 60°, three times a day. He must avoid all hearty food, and drink freely of water. In all blood-poisoning the proper thing to do is to call a good surgeon at once.

HEMORRHAGE

Hemorrhage from the nose, lungs, bowel, and uterus has been considered. Hemorrhage from a cut artery comes in spurts from the end nearest the heart, and is bright red. Hemorrhage from a vein flows in a constant stream from the end farthest from the heart, but the bleeding may come from both ends, and the blood is dark red or purple in color.

Treatment.— In arterial hemorrhage, apply pressure over the artery above the wound. Pressure is best applied with the thumbs, and against a bony surface if possible. It may be made by means of a knot in a handkerchief, or by tying it over a wad of cloth, or twisting with a pencil or stick. Do not apply pressure directly over a wound.

In hemorrhage from a finger, press upon the sides of the finger. If from the hand, apply pressure with the thumbs on the front of the wrist, on either side of the tendons prominent in the middle. If the hemorrhage is from the forearm, apply firm pressure just above the elbow, or against the inner side of the arm. In hemorrhage from the foot or leg, apply very firm pressure with the thumbs to the middle of the thigh just below the groin. When a large vein is cut in the arm, leg, or neck, apply pressure at both ends.

In severe hemorrhage always have the patient lie down. This slows the heart and lowers the blood pressure. Hemorrhage from a small artery will stop as soon as a good clot forms.

A piece of ice or very hot water will check an oozing hemorrhage, also one where only small arteries are involved.

WOUNDS

Treatment.— As soon as the hemorrhage is checked, wash thoroughly with soap and boiled water, having first scrubbed your own hands. Cover with several layers of clean cotton cloth, gauze, or cheese-cloth, and put on a bandage, or, what is easier and more serviceable, strips of adhesive plaster. All dressings for a wound should be sterilized. This may be done by baking in an oven until slightly brown, or by boiling. Every family remote from a physician should have a few simple dressings on hand for emergencies. A roll of adhesive plaster one inch wide can be obtained for twenty-five cents. Get a small package of sterilized absorbent cotton, and a few yards of light gauze for dressings, such as moist boric-acid or carbolic-acid dressing, which should be in glass jars.

For washing a wound, the best solutions are saturated boric-acid, or two-per-cent carbolic-acid (made by adding a teaspoonful of carbolic acid to half a pint of boiled water). A little rubber Davidson syringe is convenient for cleansing wounds and ulcers.

One of the most common places for wounds is the head, and one of the most common causes is a kick by a horse. Such wounds are usually deep and extensive, cutting through the scalp, or even fracturing the skull. In injuries of this character the hemorrhage is marked, but not serious; usually it will stop of itself. By applying pressure over a clean cloth, or sterilized gauze, the bleeding can be checked almost

immediately. As soon as the bleeding stops, examine to ascertain the extent of the injury. If the wound is long, and requires stitching, call a physician. If it is impossible to get one soon, boil a pair of scissors, a strong, sharp needle or two, and some strong linen thread. Cut away all the hair for an inch or two around the wound, and cleanse it with water that has been boiled, or a saturated boric-acid solution. Bring the edges of the wound together by pressing on the scalp with the fingers. With the needle and thread, take stitches about half an inch apart, and tie separately, just tight enough to hold the edges together. See that no hair is left in the wound. Cover with sterilized gauze, or with clean, soft cloth that has been boiled, or baked in the oven, and bandage. Remove the stitches in five or six days.

The same directions apply to the care of a cut or gash anywhere on the body. In taking stitches, push the needle quickly through the skin or scalp, about an eighth of an inch from the edge, and deep enough to pick up some of the loose tissues directly beneath, and then up through on the other edge. This is not so painful as it might seem at first thought.

In such wounds as cutting off the end of a finger, thumb, or toe with a sharp instrument, where immediate attention must be given, wash the wound and the piece in running water, then put the piece back in position, cover with sterile vaselin, and apply a snugly fitting wet bandage. Keep this wet by pouring on a solution containing a full teaspoonful of salt to each pint of boiled water. This must be kept up for several days. Excellent results follow in this class of wounds where these simple directions are immediately and faithfully carried out.

ULCERS

Treatment.— The process of repair in an ulcer is best stimulated by means of alternate hot and cold applications

of water. The spray is the best means, but pouring from a cup or dipper is almost as effective. Hold the arm or leg over a pail, tub, or other receptacle. Continue the treatment daily for fifteen minutes. An ulcer that does not discharge much may be dressed with a dusting powder consisting of subnitrate of bismuth, three drams; sulphur, five drams; oil of cinnamon, six drops. Dust the ulcer freely with this powder; then bandage. (The powder may be used in a clean pepper-box.)

In many cases a moist dressing gives the best results. Saturate several layers of gauze with two-per-cent carbolic-acid solution, cover with absorbent cotton, and bandage. Keep moist.

A very slowly healing ulcer may be stimulated to the more immediate work of repair by touching with pure carbolic acid, or nitrate of silver, or by scraping with the edge of a sharp knife that has first been boiled.

FROST BITE, OR FREEZING

As soon as the nose, ears, fingers, or feet become frosted, the part turns white.

TREATMENT.— Rub with snow until a good reaction is established, or, if there is no snow, use ice-water, or a piece of ice, with friction. Cold is depressing, and when a person is benumbed with cold and partly frosted, there is a tendency to sleep, which of course is fatal. A person in this condition should be aroused by spatting vigorously, rubbing, pinching, or, if necessary, by flaggelation, or whipping.

Do not take near a fire any one who has had any part of the body frosted. Keep in a cool room. Rub the affected parts with snow or ice-water, but avoid rubbing too hard. As reaction begins, give hot drinks, and gradually increase the temperature of the room to 65°; continue to give hot drinks. Later, sustain the patient by giving fomentations

to the spine ten minutes, followed by cold friction. (See Nos. 170, 184.) Wrap the frosted parts in a cool compress, and cover with a flannel. Change the compress occasionally. If the flesh has been destroyed by freezing, gangrene will quickly set in, and the patient will probably die.

TOOTHACHE

Toothache, unless due to neuralgia, shows that a tooth is decaying; hence a dentist should be consulted at once.

Treatment.— Apply an ice-bag or cold compress, frequently changed, to the neck below the jaw on the affected side, and fomentations at the same time over the painful tooth. Heat alone does not give much relief. (See Nos. 186, 170.) If there is a cavity, a little ball of cotton soaked with oil of cloves, creosote, chloroform, or aconite, will often give relief. A more simple and convenient remedy is to put a little baking-soda into the cavity. This neutralizes the acids and stops the toothache at once.

WETTING THE BED

Synonym.— Nocturnal enuresis.

This is most common in boys and girls under puberty, and is quite likely to disappear before the fifteenth year. Children having this disease are usually pallid and very nervous.

Causes.— Eichhort states that wetting the bed is a disease of childhood, and that when it occurs in the adult, it is indicative of profound nervous disease. Parents are frequently to blame for this condition, by not properly attending to the child while very young. Other causes are late suppers, constipation, worms, gas in the bowels, irritable bladder, irritation of the urethra, general nervousness, and weakness of the nerve-center in the spinal cord. As a rule, a boy who continues to wet the bed after puberty is

very likely to have nocturnal emissions. The disease is curable. It is well to bear in mind that wetting the bed is not a disease of the kidneys.

Treatment.— Outdoor exercise, wholesome, unstimulating food, avoiding meat, eggs, cheese, and fried foods. See that the bowels move daily. If there is constipation, give an enema at 90°. Children who are in the habit of wetting the bed should not eat late or hearty suppers, nor should they drink milk or eat juicy fruits at supper, as both are very diuretic. Fruits and milk may be taken earlier in the day. Very little water should be allowed after 4 p. m.

As soon as children are old enough, they should be impressed with the importance of getting up in the night. The voidance of urine is quite likely to occur two or three hours after going to sleep. Hence they should be aroused regularly at eleven or twelve o'clock and at about three in the morning, until they form the habit of getting up. Have them sleep on a firm mattress, on the side or face, not on the back, and elevate the foot of the bed a few inches. With many children getting over this habit is largely a matter of training. Parents should be persistent, not giving up after a two or three weeks' effort at cure. As soon as the child is old enough to understand, have him go as long as possible during the day before passing urine, in order to increase the capacity of the bladder.

As these children are nervous and often anemic, they need daily cold friction, electricity, and massage.

In some of these cases, medicines have given good results. I have seen much benefit from the following: —

℞ Aromatic extract of rhus ..... 10 drams
Cinnamon water sufficient to make four ounces.
M.
Sig.: A teaspoonful three times a day, the last just before bedtime.

It is cruel to whip young children for wetting the bed, when, as a rule, not they but their parents are responsible for the bad habit. Furthermore, spanking is no cure for this or any other diseased condition.

FOREIGN BODIES IN THE NOSE

Children frequently put peas, beans, peanuts, corn, paper, cotton, and other substances into one or both nostrils. Usually considerable difficulty is experienced in removing these, and in such attempts the foreign body is likely to be pushed farther into the nose.

TREATMENT.— The best way to remove a foreign body from the nose is to use a little pair of tweezers, or pointed forceps, with which to hook into it. If not successful in a very short time, call a physician.

SWALLOWING FOREIGN BODIES

Children frequently swallow buttons, coins, nails, pins, and needles. No fear need be entertained if a coin or button is swallowed; for it will pass in a few days without injury to the child. If a pin or a needle is swallowed, it must go head first, otherwise it will stick in the throat, and can not pass down the esophagus. If it does stick in the throat, vomiting will usually dislodge it.

TREATMENT.— If a child or older person swallows a sharp body or foreign substance, feed freely with mashed potatoes for several days, and it will pass from the bowels without injury to the patient. Even a long, sharp pin will pass without doing any harm.

WORMS

The subject of worms, their symptoms and treatment, has been considered in Chapter Thirty, "Drug Poisoning and

Parasites;" but inasmuch as this is a subject of considerable importance, principally because of the erroneous views held by a large class of mothers, it may not be out of place to add a few lines to what is said there.

Nearly every day the physician is sought by the anxious mother, who begins by saying, "Doctor, I think my baby has worms." When asked, "What makes you think the child has worms?" the reply almost invariably is, "Well, she gets white about the mouth, grinds her teeth when sleeping, is very restless, cries out in her sleep, and has a coated tongue and a bad breath."

It is a constant surprise to me to see the number of women in every neighborhood who pose as experts in diagnosing worms. Now it is a well-known fact among experienced physicians that very few children have worms. Not one in a hundred has them, even when all the symptoms enumerated above, and still others, are present. Inquiry into these cases will, as a rule, show that the child is fed irregularly, and that it eats all sorts of things whenever and wherever the notion takes it.

Some time ago I was hastily summoned to see a child that had a bad convulsion. The frightened mother greeted me with, "Doctor, I am sure my little boy has worms, and Mrs. Blank thinks so, too." Little Charlie, instead of having worms, had pancakes; for he ate six for breakfast! He was eating poor food, eating too much and too often. As a consequence, he was poisoned, and the convulsion resulted.

The symptoms that are thought to be due to worms are often caused by poisons absorbed from the digestive tract. These poisons are usually formed when the digestive organs are overloaded. Thousands of children and men and women are suffering from this form of poisoning, or auto-intoxication. Much of the irritability of children and adults is due to poisons formed within the body. The "blues" are commonly caused by the formation of body poisons.

AUTO-INTOXICATION

This means "self-poisoning." As already stated, this form of poisoning is common among children, and its symptoms are often mistakenly supposed to indicate worms. Auto-intoxication is very frequent among adults, the so-called "bilious attack" being, in fact, nothing more nor less than auto-intoxication.

Auto-intoxication may arise from a large number of causes, chief among which may be mentioned the following: eating too much food or too hearty food; taking food too often; improper combinations of foods; retention of food in the stomach; fermentation of food in the stomach and bowels; dilatation, or enlargement, of the stomach; poor digestion; constipation; inactive kidneys and skin.

Every living cell, from a germ-cell or a yeast-cell to the complex living organism, produces waste substances which are poisons, and which, if retained, will destroy life. Every time we think a thought or move a muscle, with every heart-beat and inhalation of air, waste is produced in the body. In sickness these waste products are greatly increased. Under normal conditions the functions of the body take care of these poisons, and eliminate them through the liver, the bowels, the kidneys, the lungs, and the skin. But as soon as the equilibrium between the amount of waste formed and the amount eliminated is disturbed, there is trouble in the body. In the child this is quickly manifested, but in the adult the process is more slow, owing to the gradual accumulation of poisons. Many persons suffer most of the time from auto-intoxication, not knowing what is the trouble.

Foods quickly undergo fermentation and decomposition, both in the stomach and in the intestine, if these organs are overburdened, or if the digestive powers are impaired. At times the process of digestion may be almost entirely stopped for a few hours. Nearly every one has had this experience

at some time. When this occurs, there is acute auto-intoxication. Fermentation is intense; nausea, vomiting, pain, headache, fever, and often diarrhea, accompany this condition. When the fermentation is mild, and takes place after each meal, the symptoms are less acute, but become more numerous as time goes on.

Vegetables and meat readily undergo decomposition, giving rise to poisonous gases and organic substances, both of which are absorbed from the alimentary canal, and interfere with the delicate mechanism of the human body.

The poisons resulting from the decomposition of meat, milk, and cheese are much more intense and disastrous in their effects upon the body than those resulting from the decomposition of vegetable foods. Chemical analysis has demonstrated that some of the poisons resulting from the decomposition of meat act very much like the alkaloids. One has a narcotic effect, like morphin; another acts like atropin, another like strychnin.

Professor Bouchard has shown that the kidneys eliminate at least seven poisons from the body. One is a narcotic, another a diuretic, and two produce convulsions. When there is auto-intoxication, all these poisons are exaggerated, so that if either the kidneys or the liver should suspend action for a few hours, death would result.

Symptoms.— These are legion. In the child, extreme irritability, restlessness, coated tongue, bad breath, and offensive stools are common symptoms; there are convulsions and languor, with grinding of the teeth and rolling of the eyeballs during sleep; finally there is loss of appetite; the child shows no disposition to play, and is very cross. In the adult, headache, backache, neuralgic pains, chronic rheumatism, coated tongue, foul breath, feeling of "dirt in the eye," yellow or dark skin, languor, depression of spirits, irritability, sleeplessness, exhaustion, and lack of ambition, indicate this condition.

Auto-intoxication continuing through a period of years may produce profound organic changes in the body, such as Bright's disease, hardening of the liver, hardening of the blood-vessels, insanity, and serious organic changes in the brain and spinal cord.

The best way to avoid auto-intoxication is to exercise care about overeating, to masticate food thoroughly, to avoid bad food combinations (see Chapter XVI, Food Combinations), and to drink an abundance of water and take plenty of physical exercise. The laboring man is not so likely to have auto-intoxication as is his more leisurely neighbor, even though he overeats, and makes all sorts of bad food combinations, because his hard work stimulates the liver to destroy poisons better, and the kidneys to do better work. The urine is less poisonous during a period of exercise than during rest.

Treatment.— If one is subject to auto-intoxication, he should avoid eating for two or three days, and adopt an exclusive diet of fresh fruits and fruit juices. A tablespoonful of castor-oil may be taken for three mornings in succession, and a thorough, high enema each day for three days. Drink two or three quarts of water each day. If leading a sedentary life, engage in some form of active outdoor work or exercise.

PTOMAINE POISONING

Chronic ptomaine poisoning is fully covered by what is said under Auto-intoxication. Ptomaines are the waste products of germs. Acute ptomaine poisoning is not only common, but dangerous. It is the cause of many deaths.

Causes.— Eating decomposed or "tainted" meat, such as sausage, chicken, and also canned meats of all kinds; lobsters, shell-fish, cheese, ice-cream, and peas and beans put up in tin cans.

Symptoms.— Intense pain in the stomach and bowels, headache, backache, shooting pains, soreness, intense vomit-

ing, retching, diarrhea, cold, clammy sweat, weak pulse, and collapse. Acute ptomaine poisoning, due to eating lobsters and shell-fish, is often accompanied by inflammation of the joints, especially of the knee, with intense swelling and pain. Ptomaine poison not infrequently terminates in death.

TREATMENT.—This should be quick and vigorous. Empty the stomach at once with the stomach tube, or by drinking five or six glasses of lukewarm salt water, or a glass of hot water, in which has been stirred a tablespoonful of mustard. Water should be taken until the stomach is clear. Give hot enema.

Apply fomentations over the stomach and bowels, put the patient to bed, and keep him warm. Give two tablespoonfuls of castor-oil as soon as the stomach will retain it. Allow no food for twenty-four hours, but give all the water the stomach will tolerate.

RUNAROUND

This is an infection that takes place in the soft tissues at the root, and around the edges, of the finger-nail. Swelling, pain, redness, local fever, and finally pus formation, are present, often with loss of the finger-nail.

TREATMENT.— At the beginning wash the finger with some antiseptic solution, such as boric acid, bichlorid of mercury, $\frac{1}{1000}$, or a five-per-cent solution of carbolic acid. Keep the finger wrapped in ice-cold compresses. If pus forms, wash with peroxid of hydrogen, and touch with a little pure carbolic acid on the end of a toothpick. Keep the finger carefully dressed, and avoid dishwater.

SYNOVITIS

This is an inflammation about a joint. The knee and ankle joints are most frequently involved. Synovitis of the knee is called "water on the knee," because there is a col-

lection of fluid about the knee-cap, along with the inflammation. Any inflammation of the knee is a serious matter, and, if possible, a surgeon should be called at once.

TREATMENT.— The patient should go to bed, and not attempt to walk until the soreness has all disappeared, and there is no pain on bending the knee. Apply large fomentations (see No. 170) around the knee for twenty minutes, every two to four hours, and during the interval keep on cold compresses (see No. 186), well covered with a heavy flannel bandage, pinned on snugly with safety-pins. For the first day or two change the compresses every fifteen or twenty minutes during the day, and once during the night. The soreness may continue from one to two weeks. After the soreness has left the knee, the joint should have massage, and the foregoing treatment for one hour three times a day.

MUSHROOM POISONING

TREATMENT.— The same as for ptomaine poisoning.

INGROWING TOE-NAIL

CAUSES.— Wearing tight shoes and trimming the nail too closely at the corners causes the edges of the nail to grow down into the flesh. Much walking, and wearing high-heeled shoes, may start an inflammation. Fleshy people are more likely to have this trouble than others. The nail of the great toe is usually the one involved.

TREATMENT.— As a preventive, trim the nails square at the corners, and wear shoes that do not crowd the toes together. If there is inflammation, keep the toe very clean; immerse the foot frequently in water as hot as can be borne, and then wrap in a cold compress. (See No. 186.) Try to lift up the edge of the nail by pushing a little ball of absorbent cotton under it, increasing its size from day to day. The toe may become very painful because of pus forming

under the edge of the nail, and proud flesh growing up over its side. The proud flesh should be covered with powdered burnt alum, or with powdered nitrate of lead.

One who is troubled with frequent attacks of such inflammation should either have the flesh outside the nail cut away or else have the nail removed, and the nail bed destroyed.

WARTS

Warts are an excessive growth of the inner layer of the skin, with a thickening of the horny layer. They are most common among children, and most often appear on the hands. They are a great source of annoyance, and often of much pain, because so easily injured. Warts appear quickly, without apparent cause, and often disappear without treatment.

Treatment.— Painting the warts with the juice of milkweed is an old and well-known remedy. This should be done frequently. Some warts will disappear if painted often with tincture of iodin. A more severe method, but probably more sure, is the use of pure nitric acid. Protect the skin from the spreading caustic by applying a thick layer of vaselin all around the wart. Then touch the wart with a small drop of nitric acid from a glass point. It may be necessary to repeat this several times.

If a wart is large, and resists all these measures, it should be cut out by making a slit-like incision on each side, and putting in one stitch to draw the skin together. In old persons, warts may develop into cancerous growths.

TUMORS

Tumors are abnormal growths of tissue, differing in structure from the normal tissue from which they are developed. There are two general classes of tumors,— the malignant and the benign.

Benign.— The larger proportion of tumors are simple, or benign, tumors, which are usually self-limiting in their growth, and, as a rule, do not endanger the life. Two possible exceptions to this rule are fibroid tumors of the uterus and ovarian cysts. These, if large enough to cause pressure symptoms, or to interfere with the general health, should be removed. It is well to bear in mind that benign tumors rarely if ever become malignant.

Malignant.— Malignant tumors are unlimited in their growth, and develop at the expense of the strength and vitality of the body; they are either cancerous or sarcomas. Cancer is the most common malignant growth, and may appear in connection with any organ of the body. The most common locations are the stomach, the womb, the breast, the lip, and the face.

Scientifically speaking, the word "cancer" does not correctly express what is represented by the malignant growth; for all cancers are not alike. Cancer may develop in various parts of the body after once starting. This development takes place through the little channels called lymphatics. If there is cancer of the breast, the lymphatic glands under the arms are always enlarged. If the breast is removed, and these glands are allowed to remain, the growth will return. One reason that operations for cancer are often unsuccessful is because the patient waits so long before consenting to an operation that it is quite impossible to remove all parts of the involved structure.

Cancer of the breast, or of any other portion of the body, is not common under forty years of age. If a patient knows that he has a cancer, the wisest course is to consult a conscientious surgeon, and have it removed. There is nothing to be lost, and everything to be gained, by an early operation. Above all things, do not temporize and make matters worse by entrusting so serious a malady to some "cancer doctor," who promises to "cure without the use of the knife."

The hope of curing cancer with pastes is a delusion and a snare. These fakirs are usually too lazy to work, and too ignorant to hold any position. Most of the tumors removed with pastes are not cancers, and would never have caused any harm if they had been allowed to remain.

OPERATIONS

Great progress has been made during the last quarter of a century in all surgical procedure and in perfecting methods, so that the more serious operations are rendered comparatively safe and successful. Medical science is by no means faultless; nevertheless it aims toward perfection. Because of improved methods, many lives are now saved that formerly succumbed to grave diseases. Years ago deaths from inflammation of the bowels were common, but nowadays we seldom hear of this as a cause of death. The disease is called appendicitis, and the surest and safest cure for it is surgical.

There is no doubt a great deal of needless surgery, performed primarily for the sake of the fee, and not because of any particular desire to benefit humanity. Many operations are performed that are not justified, and the results do not come up to the expectations; the patient is disappointed, and confidence is lost.

Successful surgery is the highest manifestation of skill in the healing art; and the desire to be a skilful surgeon is not an unworthy ambition. The most successful surgeons are those who have studied faithfully, worked conscientiously, and made themselves such by long experience. The physician who feels that he has a special "call" to be a surgeon is one to be afraid of, and to avoid. The conscientious and conservative surgeon is by far the safest to trust.

No surgeon can promise a cure or perfect results from every operation. The probabilities are, however, that in most operations, barring complications, the results will be good.

One of the most serious features about an operation, and one that often gives rise to fatal complications, is the giving of either ether or chloroform. The operation itself may be a success, but the patient may die from the effects of the anesthetic, either at the time of the operation or a few days later. Again, a patient may suffer from what is known as "shock" immediately following an operation; and no surgeon can say it will not happen. Still, with the proper precautions, it does not occur in many cases.

It takes a great deal of courage for a patient to make up his mind to submit to an operation. Surgeons become so accustomed to using the knife that they often overlook this fact. No patient should submit to an operation unless he has good reason to believe that he will be benefited by it. In many operations, this is a chance. Especially is this true with many of the operations performed upon the pelvic organs of women: the results are often disappointing.

However, this is not true in such diseases as appendicitis, gall-stones, abscess following disease of the middle ear, cancer, hernia, and obstruction of the bowels. If the operation is performed early in all these conditions, the probability of beneficial results is excellent. In any operation the patient must take some chance, and be willing to assume some risk.

COLD FEET

A cool head with warm feet is a much better combination than cold feet and a hot head! Cold feet do not necessarily indicate poor circulation. Many who suffer from cold feet have strong, active hearts and healthy blood-vessels.

Causes.— Those who are of a nervous temperament, and are on a high nervous tension much of the time, are often troubled with cold feet. A very common cause of cold feet is irritation of the sympathetic nerve-centers, due to stomach and intestinal indigestion. The nerves that control the blood-

vessels of the extremities are in a constant state of irritation, contracting the blood-vessels and so diminishing the supply of blood to the feet. The hands and feet may be warm, but may become cold in half a minute's time, simply because of some sudden nerve strain or emotion. This is not poor circulation, but nerve-irritation.

Cold feet are very common following acute or exhausting sickness, and among the feeble and aged. In these cases the cause is usually due to a weak heart or imperfect heart action, and to a lack of tone of the blood-vessels.

Cold feet have a depressing effect on all the vital activities. A person who is troubled with habitual cold feet is very susceptible to "colds," pneumonia, and other acute diseases. Women and girls who wear low shoes and thin stockings in cold weather naturally have cold feet, and are subject to many acute disorders of the pelvic organs and mucous membranes.

Treatment.— The best way to warm the feet is to put them into hot water. This dilates the blood-vessels, and causes a large amount of arterial blood to flow through the lower extremities.

The alternate hot and cold foot bath is one of the most effective measures in overcoming the tendency to cold feet. Dip the feet frequently back and forth from a vessel of hot water into one of cold water. This will excite an active circulation. Taking a run through the wet grass in the morning will have the same beneficial result.

COLD-SORES

Synonym.— Fever blisters.

Cause.— Irritation of nerve-endings.

Cold-sores, or fever-blisters, are present in pneumonia, *la grippe,* malaria, and acute colds; they may appear very suddenly on the lips. If taken in hand when they are first noticed, they may be aborted.

Treatment.— Rub with camphor, or hold a piece of ice wrapped in a cloth on the cold-sore. The swelling will soon disappear. Alternate very hot and ice-cold compresses will sometimes effectively check cold-sores.

CANKER-SORES

These are exceedingly painful little sores that appear on the mucous lining of the lips and inside the cheek, also on the tongue.

Cause.— Stomach and intestinal indigestion, with lowered vitality.

Treatment.— The best local treatment is to rinse the mouth thoroughly, after eating, with some antiseptic wash, such as listerine, or a ten-per-cent solution of chlorate of potash. Then wrap a little absorbent cotton on the end of a toothpick, dip it into a ten-per-cent solution of silver nitrate, and touch the sore places at every point. Two or three such applications will be all that is necessary to remedy the difficulty.

Patients troubled with frequent canker-sores should recognize them as a warning by the digestive organs. Attention should be given to the teeth, the diet, proper food combinations, thorough mastication, and the correction as far as possible of all disorders of the stomach and bowels.

NIGHT AIR

It would hardly seem necessary to say anything in reference to this subject in this day and age of the world. However, it is astonishing to note the number of people who cling to the superstition that night air is bad, and hence to be avoided. It would be interesting to know how it can be avoided. We are not prepared to live in a vacuum yet. What other air has the Creator given us to breathe after the sun goes down, than night air? Lighting the lamp, and shutting

the doors and windows, do not change night air, except to make it foul and unhealthful.

The night air is cool and refreshing, and should be invited into our homes in the freest possible manner. In fact, if the whole human race slept outdoors, protected only from storms and mosquitoes (for it is probably the diseases that accompany the bite of some mosquitoes that have caused the inborn dread of night air), tuberculosis and many other affections would soon be as much of the past as is leprosy at the present time.

About one third of man's life is spent in sleep. During this period the body is in a state of physiological rest. All restorative processes are going on more rapidly, and more oxygen is being stored up in the tissues, than during the day. The body is being prepared for another period of activity. Hence an abundance of pure, moving air is a matter of vital importance. Six hours sleeping in a tent or on an open porch is more refreshing and invigorating than eight hours in a room, even with the window partly up.

It is a fact well known among sheep-herders, who sleep out on the hills, rolled up in a blanket, and others who sleep in the open air, that the first few nights they sleep in a room, they are very likely to take cold. The reverse, however, is not true. Poor ventilation quickly reduces the resistance of the body; for healthful blood can not be made from unwholesome air.

The crusade for sleeping in the open air should be joined by every man, woman, and child. It means better health, more wealth, and greater happiness.

INSANITY

The term insanity represents a large group of symptoms produced by a diseased brain or mind. Diseases of the mind bear the same relation to the brain that diseases of the liver

or stomach bear to those organs. Diseases of the liver give rise to abnormal functions. Diseases of the mind give rise to perverted functions. The dividing line where these functions become perverted, and render a person insane, or simply "queer," or "strange," is sometimes very difficult to determine. A person may have a disordered mind, and still not be insane. Such a disordered mind may cause him to make serious errors in judgment. He may not even recognize his error, and still not be insane.

The brain receives impressions through the special senses. These impressions are called perceptions,— perceptions of sight, hearing, smell, etc. The normal mind groups all these perceptions together, and forms a conception. The conception may be a wrong judgment, but the normal mind can correct it. Not so with the insane mind. The perceptions can not be grouped, and the mind can not correct a faulty conception.

This brings us to the consideration of the workings of the insane mind. The perceptions are wrong, or perverted, and so he has *illusions.* The man with delirium tremens sees a chair, and thinks it a terrible reptile. The insane may have a *false* preception. He thinks he sees things, or hears various voices, that do not exist. Such a person is the subject of *hallucination.*

Perverted and false perceptions lead to a faulty belief, or *delusion.* Dr. Wood says, "A delusion is a faulty belief concerning a subject capable of physical demonstration, out of which the person can not be reasoned by adequate methods for the time being."

Most insane patients have what are called *unsystematized delusions:* they make no attempt to justify their faulty belief. Such patients may have a *fixed delusion,* which is entertained for a long time. For instance, an insane woman may think she is Queen Victoria; or a man may think that he is Napoleon, or that he possesses millions of dollars, and

is going to build a railroad to the moon. This condition is known as the *delusion of grandeur*. Again, the patient thinks he has committed the unpardonable sin, and a burning hell is anxious to receive him; or he may fancy that he is being persecuted. In time these delusions may lead the insane to commit suicide, or to do violence to others. Any person may have a faulty belief or have wrong perceptions; but the sane mind, by logical arguments and reasons, can be led to see its error and abandon it. Not so, however, with the insane. He can not be led to see the absurdity of his belief, nor is he influenced by logical arguments. However, some patients who are insane on only one thing may attempt to defend their delusions by more or less logical reasoning.

The insane are often controlled by what is known as an *imperative impulse*,— a strong impulse urging the victim to do certain acts or to commit certain crimes. He may know that it is wrong, but the impulse compels him to yield.

The classification of the different forms of insanity is a very difficult matter, and at the present time it can only be said to be tentative.

Paranoia represents a type of insanity which is expressed by the laity in such terms as craziness, or madness. This type is usually incurable. It is said that many of the founders of religious sects are paranoiacs. Most of the false christs, saviors, and messiahs belong to this class. Such patients are not intellectually dull. They may be fine speakers, and good reasoners for a time.

Paranoia develops slowly. The patient has either delusions of persecution or those of egotism. He becomes suspicious and distrustful. He imagines that people talk about him; that he hears threatening words and secret whisperings; that he is followed. In time he feels that he must protect himself and avenge his wrongs, and so may commit violent acts. Usually at this stage the patient is placed in an asylum.

Mania is a state of insanity characterized by great mental excitement; while —

Melancholia is manifested by marked depression. Both these types usually occur in the same patient. In melancholia the patient broods over imaginary wrongs and unpardonable sins. These morbid ideas lead to self-destruction and violence to others. Such patients are always dangerous, and need to be watched carefully.

Dementia præcox is a form of insanity, the result of a mental breakdown in the young, at about the age of puberty. It may often be avoided if taken in hand early.

Insanity is increasing in an almost geometrical ratio. The asylums of the world are full to overflowing. The principal causes of insanity are alcoholism, heredity, syphilis, worry, and the tremendous nerve strain due to modern life. A nervous system subjected for years to the strain incident to the seeking of wealth, and political and social position, will in time break down.

Treatment.— Preventive measures are even more important than in the infectious diseases; for diseases of the mind and brain are the most serious maladies that afflict the human body. One principle laid down in the Scriptures, if obeyed, would in one generation remove the cause of insanity from the race,— "Let your moderation be known unto all men."

The insane should have pleasant and cheerful surroundings, good music, recreation, and useful employment. The diet should be abundant and wholesome, avoiding meat, tea, coffee, and all forms of alcoholic drink.

Mental and physical excesses are important factors in the great increase in mental diseases. Moderation in mental and physical work, in diet, in seeking for wealth, in social and political position, in all habits of life, will prevent a mental breakdown. Temperance, contentment, industry, and a sincere trust in God, will strengthen and develop nerve power and endurance rather than diminish them.

An insane person should be recognized as mentally sick, and treated accordingly. He should always be treated with kindness but with firmness and authority. It is folly to entertain ill-feeling or a grudge against such a patient because of things he says or does. He is insane: his words and actions are his symptoms. It would be just as absurd to get angry with a typhoid-fever patient, because he had a hemorrhage or a headache.

Moreover, it is time worse than wasted to try to cheer up a patient depressed with melancholia. Amusement is torture. The gloom of despondency is unwelcome, and yet it holds full sway, even for months. For the time being, the will of the patient is a slave, and something greater is required if freedom is to be restored. With the proper treatment, more than half the cases afflicted with mania or melancholia get well. If the mind does not clear up within two years, it is not likely to do so.

There is no necessity for confining the insane in State institutions unless they are dangerous, or can not receive the proper care and treatment at home. In the majority of cases, treatment in a private sanitarium gives the best results. Here the patient has the proper surroundings, and the treatment is adapted to individual needs.

Remedies

Argyrol is not an official drug; but as it is one of the best silver preparations for treating the eye and mucous membranes, it is mentioned in this connection. For inflammation of the eye and bloodshot eye, use a ten-per-cent solution, using one drop for each eye once a day. For inflammation of the throat, swab with a ten-per-cent solution. Argyrol is one of the best preparations for treating gonorrhea.

Aromatic Cascara.— This is a sweetened preparation of the fluid extract of cascara. It is one of the best preparations for chronic constipation. For an adult, give a teaspoonful at bedtime and one before breakfast.

Balsam of Peru is a most excellent remedy for stimulating the healing of ulcers, burns, or any slowly healing and suppurating wound. It is very thick, and flows slowly when cold. It has a very pleasant odor. Cleanse the wound, and then pour the balsam on freely, and cover with clean and antiseptic dressings.

Benzoin in the form of the compound tincture is a very soothing remedy for an irritating cough. Use a teaspoonful in a pint of boiling water; inhale the vapor. This may be put in an open vessel and inhaled through a cone-shaped paper funnel.

Boric acid is a mild and safe antiseptic for use in treating the eye, or disinfecting and cleansing wounds. The powder may be used as a dusting powder, and the crystals for making solutions. A saturated solution is not too strong for the eye or for a wound.

Bismuth Subcarbonate.— A remedy for sour stomach. Dose, thirty grains after meals.

Carbolic acid may be used as a disinfectant on the skin in two to five per cent solutions, or in the proportion of ten to twenty-five drops to the ounce of water. For vaginal douches it may be used in two per cent solution. Never use *pure* carbolic acid without having alcohol at hand to neutralize it if by accident it is spilled on the skin.

Castor-Oil.— As a reliable and efficient cathartic no drug is better for acute constipation or the beginning of fevers than castor-oil. There are two objections to this drug,— its nauseating taste, and the slight constipation that may follow its administration.

The taste of castor-oil is best overcome by the use of lemon-juice. Have ready a slice of lemon with a little sugar; and as soon as the oil is swallowed, instruct the patient to chew the lemon. This will completely overcome the taste of the oil, and prevent nausea or vomiting. The lemon is superior to brandy, milk, coffee, etc., frequently used to disguise the taste of castor-oil.

The dose of castor-oil is as follows: One to six months, one teaspoonful; six to twelve months, two teaspoonfuls; one to five years, a dessertspoonful; adult, one to two tablespoonfuls.

Formalin, or formaldehyde, is the best disinfectant for fumigating rooms after any infectious disease. Formaldehyde torches of various sizes can be obtained at any drug store. The size of the torch will be decided by the air capacity of the room. Simply follow directions. It takes several hours to thoroughly ventilate a room after the use of formalin.

Iodin, Tincture of.— This is used only for external applications. It is an excellent counter-irritant to paint on the skin over inflamed glands, deep-seated soreness, and along the spine for backache or neuralgia. Paint on thoroughly with a camel's-hair brush, or with a feather. Repeat for two or three days, and then on alternate days.

Milk of Magnesia.— Use for sour stomach one tablespoonful in as much water, one hour after meals.

Menthol Liniment.— Add one ounce of menthol to a pint of alcohol. When using, add an equal amount of water. This is an excellent liniment for all inflamed joints, bruises, headache, and rheumatic troubles.

Nebulizer Solutions.— 1. For acute colds, use the following in a nebulizer frequently: —

℞	Menthol	30 grains
	Eucalyptus	30 grains
	Camphor	30 grains
	Albolene	2 ounces

Or (2),—

℞	Menthol	20 grains
	Oil of eucalyptus	30 grains
	Oil of cinnamon	20 drops
	Albolene	2 ounces

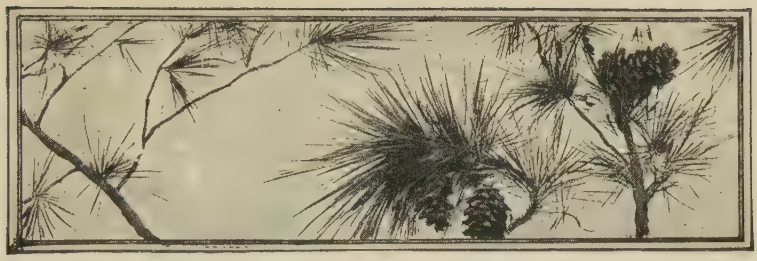
3. For a severe cough, use the following in a nebulizer: —

℞	Menthol	30 grains
	Oil eucalyptus	1 dram
	Oil of tar	1 dram
	Creosote	1 dram
	Oil of cinnamon	30 drops
	Compound tincture benzoin	4 ounces

4. For an inhaler use a few drops, as needed, of a solution consisting of equal parts of menthol and camphor, with a few drops of oil of cinnamon added.

Peroxid of Hydrogen.— A colorless liquid, used externally for cleansing and disinfecting wounds. It has no effect on a healthy skin. It will turn hair white or bleach it. For disinfecting wounds, it may be used pure, or diluted one part to three of water. It possesses the power of destroying pus and germs in a marked degree.

Sweet Spirits of Niter.— Dose for a child one year old is five drops, repeated every two or three hours. Always give in cold water. This preparation often gives good results in fever, and when the kidneys are not active.



CHAPTER XXXIX

The Conservation of Health

MODERATION

There is one metaphor in literature that I believe to be universally true. It is this: "Moderation is the silken string running through the pearl chain of all virtues." Is it not the common observation that without moderation any virtue is bound to run into fanaticism, obscurity, or weakness, or to be crushed underfoot and robbed of its beauty? Take the virtue of truthfulness. Is that truthfulness a virtue which is not joined by moderation to those other virtues, love and mercy?

In the physical as well as the moral world the virtues are all strung upon this same silken thread, moderation. Health is that physical righteousness which results from the practise of the physical virtues. It is the "pearl chain."

Everybody longs to possess the priceless necklace of health. Many fail to obtain it because they do not realize that it is a treasure of separate jewels, every one of which must be faithfully earned and carefully guarded on the silken string.

It is true that health is often inherited. But the vast majority of persons neglect this precious heirloom. The string

is broken. The pearls are scattered. Some are preserved because their value is recognized, but others are thrown away as being of no intrinsic worth.

Most of us, however, it seems to me, lose or never win true physical righteousness chiefly because we have sought certain of the physical virtues at the expense of others, and have quite disregarded the shining thread that must run through all.

Some try to find health by practising the one virtue of exercise. They think that if they walk far enough and fast enough every day, or manipulate pulleys and Indian clubs, or practise Swedish gymnastics, they may eat what they please and when they please, and sit up till midnight seven times a week — and still be well. Others reverse this theory, and believe that everything depends upon diet,— that if a man eats only simple and wholesome fare, he may neglect physical exercise, work all day and half the night at a high tension of nerve and will, and still maintain vigorous and sound health.

Another class extols the virtue of sleep, or of recreation, or of some particular game or sport.

Many, alas! seek after false jewels,— tonics, medicines, fads of all sorts,— thinking with them to fashion the ornament health. But sooner or later these spurious gems crumble or tarnish in their hands; and they are left with worse than nothing for all their trouble.

The man who magnifies one physical virtue, and fails to give the rest their proper place, is working an evil as widespread as his influence. He is really a sinner. Like Romney, in "Aurora Leigh,"—

> He builds his goodness up so high,
> It topples down to the other side,
> And makes a sort of badness.

The apostle Paul said, "Every man that striveth for the

mastery is temperate in all things." It is quite likely that in this great man's mind the "all things" included working and sleeping as well as eating and drinking. "Let your moderation be known unto all men."

Would you have health? Would you carry an atmosphere of health wherever you go? Then gather and cherish every virtue that nature has decreed belongs to that sacred and beautiful whole. Take exercise,— not spasmodically or excessively, but in moderation. Eat simple and healthful food — not too much, too little, too often, or too seldom, but in moderation. Take sleep — not fitfully, two or three hours one night and ten the next, but regularly, and in moderation. Wear healthful clothes — not bags, but garments made with sense and moderation. Take recreation — not long, idle vacations, or short, feverish pleasure trips when your health has threatened to give way, but sensible, wholesome outings by which the whole current of your thoughts is changed, and your entire being refreshed. Seek with equal ardor all these shining gems that make for physical righteousness. Preserve their beauty and unity by keeping them always upon that "silken string," and you will have a possession of worth untold, not only to yourself, but to every one whose life touches yours.

RECREATION

This is an age of extremes, of specialties. Some people make a specialty of work, others of idleness. Those who work often work too hard; while those who make a business of idling, habitually overdo it. However, since it is not at all likely that any of the latter class will ever read these pages, it would scarcely be worth while to admonish them. In passing, one might merely hand on the injunction of Mrs. Browning: "Get work; be sure 'tis better than what you work to get." There is wonderful recreative power in work

for those whose energies are stagnant; but the health of the world is not in great danger of suffering from the indolence of the idle. Affairs are so arranged that it is difficult for any large number to avoid work altogether. On the other hand, it is made very easy indeed for those who are so disposed, to work too hard,— or rather, too much and too long; for there is no such thing as working too hard.

Even metals, we are told, get tired. They lose their vitality from repeated shocks or strains, and may be said to be literally exhausted. They need rest. In the words of a scientific exchange: —

"As is familiarly known, bars of tin, rods of brass, and wires of any metal will separate, owing to fatigue, if bent backward and forward continuously. By careful experiments, however, the fact is made to appear that a remedy exists for this condition of metals, if the overstrain does not border on rupture; and this remedy is very much like that which is applied in the case of an overworked human frame; namely, rest. Feather-edged tools recover their vitality better than any other. Of course the length of time required for the rest varies with different metals, and the amount of strain to which they have been subjected. Hard metals, such as iron and steel, use up one or two years' time in the process; on the other hand, soft metals, like lead, retain their cohesive force longer, and require less rest."



If a thing so simply organized as iron or steel, can become exhausted and need rest, how much more must this be true of men and women.

Recreation is the esthetic and vitalized form of rest. One may rest by sleeping. Happy is he who is not too weary, or too busy, or too ill, to add to sleep the exhilaration of outdoor air and exercise. Unfortunately, it is usually those who need it the most who appreciate least the necessity of recreation. Perhaps it would be more correct to say that they do not understand the nature and function of this recuperative process. The overworked housekeeper says, with a sniff, "I guess if you traveled as many miles a day as I do just around this house, you wouldn't need to play golf." This housekeeper may not need to play golf, but she does need to get outdoors,— to forget completely, at least once a day, all the vexing details that crowd the inside of walls, to enjoy, if only for one brief hour, the unfiltered air, the unscreened sky, the unfloored earth.

The day laborer needs the recreation of an hour's quiet reading or study, in the evening, perhaps, with his tired feet on a chair, and his whole weary body at rest while his mind receives the stimulation and exercise necessary to the equilibrium of health.

The life of the modern business man, from the standpoint of hygiene, is all wrong. This is the more lamentable because in most cases it might be avoided without loss to the business. If the business man were to take real recreation instead of still further dissipating his energies by clubhouse dinners, theater parties, card parties, pleasures that can not be enjoyed under green trees and beside quiet waters, both he and his business would live longer and be healthier.

Hamerton, in his work on "The Intellectual Life," urges the importance of recreation, especially in the form of exercise, for all brain workers. He claims that "intellectual labor proceeds upon a physical basis," and that "literary work acts simply as a strong stimulant. In moderate quantities it is not only innocent but decidedly beneficial; in excess it acts like poison on the nervous system." The in-

tellectual laborer, then, no less than any other, needs the constant tonic of simple and restful diversion, and it will generally be found that whenever a man of intellectual distinction has maintained his powers to a good old age, he has taken pains to counteract the evil influences of a sedentary life by systematic recreation.

It is important for workers of all classes to remember that recreation can not be condensed into a few moments a day or a few days a year. There is no such thing as violent recreation. "Even the fresh air itself requires time to renovate the blood. The fresh air can not be concentrated; and to breathe the prodigious quantities of it which are needed for perfect energy, we must be out in it frequently and long."

Are we taking it for granted that the outdoor air is a necessary element of recreation? But is it not so? If we believe in recreation, and are willing to spend our time in taking it, shall we not insist upon the best? Nothing so invigorates the whole being, both mind and body, as does the fresh, living, personal contact with nature's silent, healing, and soothing forces. Just to sit upon the grass whose life-work is simply to grow and to keep green; just to look up among the shining leaves whose life-work is simply to breathe for the tree; just to listen to the brook whose life-work is to run and to sing; just to forget that I — or you — have any work in the world to do except to grow and to be happy,— this is recreation of the very highest type.

Hamerton again quotes Goethe's verses: —

Wie das Gestirn,
Ohne Hast,
Aber ohne Rast,
Drehe sich jeder
Um die eigne Last.

(Like a star, unhastening, unresting, be each one fulfilling his God-given behest.)

This is in harmony with the theory of those who hold that a reasonably natural and moderate working life exempts from devoting special periods to recreation. Our distinguished English author, however, thinks differently. He says: —

"This is said so beautifully, and seems so wise, that it may easily settle down into the mind as a maxim and rule of life. Had we been told in plain prose to take no rest, without the beautiful simile of the star, and without the wise restriction about haste, our common sense would have rebelled at once; but as both beauty and wisdom exist together, in the gem-like stanza, one's judgment remains silent in charmed acquiescence.

"Let us ask ourselves, however, about this stellar example, whether man is naturally so constituted as to be able to imitate it. A planet moves without haste, because it is incapable of excitement; and without rest, because it is incapable of fatigue. A planet makes no effort, and encounters no friction or resistance of any kind. Man is so constituted as to feel frequently the stimulus of excitement, which immediately translates itself either into actual acceleration, or into the desire for acceleration,— a desire which can not be restrained without an effort. Whatever man undertakes to do, he encounters friction and resistance, which, for him, always sooner or later inevitably induce fatigue. Man is neither constituted like a star nor situated like a star, and it is not possible for him to exist as stars exist.

"If you will have a model for your living, take neither the stars, for they fly without ceasing, nor the ocean that ebbs and flows, nor the river that can not stay; but rather, let your life be like that of the summer air, which has times of noble energy and times of perfect peace. It fills the sails of ships upon the sea, and the miller thanks it on the breezy uplands; it works generously for the health and wealth of all men, yet it claims its hours of rest. 'I have

pushed the fleet, I have turned the mill, I have refreshed the city; and now, though the captain walk impatiently on the quarter-deck, and the miller fume, and the city faint, I will stir no more until rested.' "

THE TRINITY OF HEALTH

Goodness, health, beauty, are one. Goodness is the perfection of character. Health is the perfection of body. "A sound mind in a sound body," is a complete definition of beauty. Here is a trinity — three in one — that all may understand and believe.

The homely saying, " Be good, and you'll be handsome," is but a half-truth if taken at the popular estimate of its meaning. It is not enough to " mean well," to be " good " morally or spiritually alone, if you would be handsome. In these days it is not enough simply to have high desires and noble ideals, simply to live a " blameless life," if you would be wholly good; for goodness, health, beauty, are one, and he who would have perfection of character and perfection of body, the glory of true beauty, must use knowledge and wisdom and strength of will in bringing all the physical, the intellectual, and the spiritual forces of his whole being into perfect harmony with the laws of nature, which are the laws of God.

Disease and suffering follow unconscious sins against nature just as inevitably as if the sinner had understood and accepted their consequences. The man who keeps late hours attending religious services, and the man who keeps late hours drinking and carousing, must pay the same penalty so far as the late hours and loss of sleep are concerned. The woman who gives her children unsuitable food, and trains them in unhygienic habits of living, though never so conscientiously, is sowing the seeds of disease and ugliness just as certainly as if she did it intelligently and purposely.

It is imperative, in the first place, that the relation between physical habits and functions, and beauty of person and of mind, be studied and understood. Tradition and custom are the natural enemies of improvement. In all ages the doubter, the questioner, the investigator, has been the friend of progress. The person to-day who would become beautiful, must bring every habit of his life into the light of present knowledge, and have it examined by the latest scientific standards of health. He must be convinced that to know how to live is a sacred duty; and if any habit is condemned by his investigations, he must be ready to carry out the verdict with determination and common sense.

GALLOPING CONSUMPTION AT THE TABLE

It is often asserted that the present generation lives more in twenty-five years than our ancestors of two centuries ago did in fifty. It may be said with equal truthfulness that the present generation eats as much in twenty-five years as our forefathers did in fifty, and in one half the time.

We stand aghast at the frightful ravages and the progressive onward march of tuberculosis. One seventh of all the deaths to-day are attributed to this dreadful malady. In some of the large cities, one out of every four that die succumbs to this disease. But it is little realized, and much less appreciated, that there is a "galloping consumption" going on at the table, even more extensive and destructive than tuberculosis.

Haste in traffic, haste in business, haste in education, haste in pleasure, have led to haste in eating, drinking, thinking, sleeping, until physical degeneracy and premature decay stare us in the face on every hand. But of all the evils resulting from the terrible momentum of modern life, hasty eating is the most far-reaching and the worst. It may safely be said that hasty and promiscuous eating annually results

in more distress and more deaths than are caused by tuberculosis; it is even one of the most important predisposing causes of this disease.

Tuberculosis is not more at variance with the plan of nature than is the rapid consumption of food. That nature intended man to find a real pleasure in eating, is evident from the fact that natural foods are variously and delicately flavored, and that man is endowed with the sense of taste to appreciate these flavors, and with the sense of smell to enjoy natural odors. The surface of the tongue is the seat of the sense of taste; hence the pleasure that attends eating does not consist in the amount of food that can be disposed of, nor in the rapidity with which it can be eaten, but in the length of time it remains in the mouth, stimulating this sense of taste. It would be well for the rapid eater to take notice that the taste buds are on the tongue, and not scattered throughout the length of the esophagus or in the walls of the stomach.

To be convinced that few individuals appreciate either the pleasure or the necessity of eating slowly, one need but look about him anywhere. Tarry a few moments at a ten-cent lunch-counter or in a popular café. Here the business man, the lawyer, the clerk, the typewriter, rush in madly, almost with watch in hand; give their orders with feverish haste; gaze after the waiter with "time" and "hurry" corrugating their faces; and fall upon sandwiches, mutton chops, pie, cheese, coffee, mustard, pepper, pickles, as if their life depended upon bolting the whole meal in five minutes. The business man becomes so accustomed to swallowing a large dinner in fifteen minutes that he feels as if it were an enormous waste of time to spend half an hour at the table.

Nor is this "gustatory lightning" confined alone to the lunch-counter and the restaurant. It may be seen especially at the breakfast table in almost any household. The father of the family is in a hurry to make the train, to get into

the field, to read the papers; his wife eats fast so as to finish when he does, and the children follow the example of their parents. So fruit and oatmeal,— cooked in five minutes and deluged with sugar and cream,— beefsteak, fried potatoes, bread and butter, are swallowed almost whole, and washed down by frequent gulps of hot coffee, tea, water, or other drinks. The coffee is taken partly to make the food go down faster, and partly to brace up the system for the morning's work; for experience has demonstrated that the solid part of the breakfast can not be depended upon for any immediate comfort or sustenance. What wonder, when it is obliged to remain in the stomach several hours longer than nature intended, and where it often undergoes fermentative and putrefactive changes instead of being prepared to nourish the body?

Schoolboys and schoolgirls of to-day hurriedly eat a few mouthfuls in the morning, and rush off to school. At noon there is an hour's intermission, and this again necessitates hasty eating. We are a nation of dyspeptics, and the foundation of our disease is laid in early youth by hasty eating and improper food combinations.

The train stops five minutes for lunch, and everybody rushes for the lunch-counter, and wildly attempts to eat a regular meal in three minutes. The statement of an eminent lecturer that people are literally digging their graves with their teeth can be demonstrated on all sides.

Nature furnishes man with thirty-two teeth, some for breaking off pieces of food, and others designed to crush it. The entire anatomy of the mouth clearly indicates that food should remain in it some time before being swallowed. If food remains in the mouth only a few moments, an insufficient amount of saliva is secreted, and mingled with the food; hence salivary digestion is but partially performed. If mastication is neglected, the food is not properly crushed, and so is not readily acted upon by the saliva or by the

gastric juice. Food that is poorly masticated is swallowed in chunks, which resist the action of the gastric juice for a long time, and produce irritation of the walls of the stomach.

The secretion of saliva depends upon a mechanical excitation produced by a foreign body in the mouth, and also upon the action of the jaw. The softer or more liquid the substance, the less the secretion of saliva; the drier the food, the more the saliva. Soft foods are quickly swallowed, so but little saliva is mixed with them to pass into the stomach, and continue the starch digestion. The saliva is also quickly neutralized by the acid of the gastric juice.

Hasty eating produces a sensation of thirst, hence the common practise in America and other countries of rinsing down food with tea, coffee, iced teas, ice-water, lemonade, and other beverages. This delays digestion by diluting the little saliva and gastric juice that have been given time to form; the cold drinks also lower the temperature of the gastric contents, so that digestion is completely at a standstill until the temperature at which digestion takes place is restored, and the fluid has been absorbed.

Hasty eating leads to overeating, so that the entire digestive system is overburdened, causing all the organs to do too much work,—"to put in extra time,"—to rid the system of this surplus food. Excessive consumption of food eventually leads to a consumption of the tissues, either in general or in part, because of the poisons circulating in the fluids of the body and retained in the tissues.

The galloping consumption of food, or eating on the run, is not only a great physical evil, but is a social evil as well. We have come to such a pass that conversation at the home table, if no guests are present, is very little practised; for galloping consumption and fluent conversation can not be carried on at the same time. Thus far it is the conversation that has suffered, while the consumption is increasing at a high rate. The hearty laugh, that proverbial digestive tablet,

and the light and airy table talk that make the charm of social eating, are in these days classed among the luxuries of life, and made the accompaniment of evening dress, cut glass, and three-hour banquets or elegant dinners. But they really belong among the necessities, and should accompany slow eating, careful mastication, and a quiet frame of mind. A longer time spent at the table every day in thoroughly preparing food for the different processes of digestion, would save many a man and woman years of misery, ill health, and disappointing, ineffective work.

THE PHYSIOLOGY OF OLD AGE

Man has been called a microcosm,— a little world in himself,— because he is a partaker and representative of everything in the inferior creation. In him are combined the material and the spiritual, the animal and the rational. He is allied to the animal creation by his instincts, propensities, desires, and passions; and to God and the higher intelligences by reason, conscience, and free will. Being thus endowed, man is able to adapt himself to his environment. He is capable of making progress, and of utilizing the things of creation to minister to his happiness; hence man may be said to be the architect of his own character, and the sole keeper of the house in which he dwells — the body.

Intellectually, no limit has been placed upon the development of the mind except that made by the individual; and physically man may attain to a perfect physique and the enjoyment of perfect health. The only reason why one individual stands head and shoulders above his fellows in the intellectual world is because he has used his brain,— he has learned to concentrate his powers of mind, and to avoid a needless expenditure of energy.

The same principle applies to the physical nature. The life that is brought into harmony with natural law, making

a conservative use of all its forces, has the promise of health, and the possibility of a continuance of at least one hundred years, terminating in a physiological death. When nature is not interfered with, birth is a natural physiological phenomenon; death should be just as natural a process. A premature birth results disastrously to the life that otherwise might have been useful; a premature death is a loss that can never be compensated. Cicero, speaking of the termination of life, says: "The happiest ending is when, with intellect unimpaired and other senses uninjured, the same nature which put together the several parts of the machine takes her own to pieces. The same nature which glued together the human machine, takes it asunder most skilfully."

Old age is the product of non-conformity to natural law. It is a relative term, with wide variations. It has been said that a woman is as old as she looks; Oliver Wendell Holmes said, "A man is as old as he feels;" but the assertion of the eminent French physiologist, "A man is as old as his arteries," is more correct. Youthfulness or age is expressed in the condition of the blood-vessels that form the channels of communication in the body, through which circulates the blood,— the medium of exchange to every cell,— and in their elasticity, or their ability to dilate and contract.

Some time ago the writer was in a large hospital where there were between four and five hundred patients. These were all classed and located according to their diseases; in one room were more than fifty who had some disturbance of the circulatory system, and side by side were several patients whose arteries were as hard and almost as brittle as pipe-stems. Yet none of these had passed the twoscore-and-ten mark; in every case the cause could be traced to excesses of some kind. These individuals were prematurely old — older at forty-five than they should have been at seventy; their age was not measured by years, but by the manner in which they had spent their lives.

A very able temperance lecturer, in addressing a company of young people, during the course of his remarks gave this advice, "Start right, keep right, and you will end right." A large number of those now advanced in years may not have started right; but if they would have their lives terminate in a golden sunset, they should make an effort to "keep right," and to pursue such a course of life as is most disposed to retard the appearance of the symptoms of old age.

There is continually going on in the body a work of disintegration, or a tearing-down and a building-up process, which varies somewhat in the three different periods into which life is naturally divided. First, there is the period of growth, when the repair is greater than the waste; hence the need of a larger amount of food proportionately for a growing child than for an adult. Second, the stationary period, when the waste and repair have established a condition of equilibrium, both being equal. This period continues until the age of about forty-five or perhaps fifty years, varying with the individual and the manner of life. Third, comes the period of decline, when the waste is in excess of the repair and building-up process. It is to this period that attention is called in this paper.

Scientific research has made it more and more evident that most of the diseases of advanced life are due to interruptions in the process of waste and repair. Most of these diseases are of a gouty or rheumatic nature, a condition in which the poisonous waste material of the body, not being properly eliminated, is retained in the system, and reabsorbed and deposited in the tissues and joints, giving rise to innumerable ills. This retention may be very slight at first; but if it were only one grain a day, it would amount to nearly one ounce in a year, and in the course of years a sufficient accumulation would have taken place to produce serious results. It is the retention of these poisons that affects the lining membrane of the heart and arteries, producing the

condition of hardening already mentioned. There is abundant evidence to show that many cases of cancer, Bright's disease, organic heart-disease, and distressing diseases of the stomach are directly due to the accumulation of these poisons in the body. Neurasthenia, or loss of nerve power,— a convenient term sometimes used to cover a multitude of sins on the part of the patient as well as a multitude of errors in diagnosis on the part of the physician,— is a condition of nerve-poisoning due to the generation and retention of poisonous materials within the body. In order to obviate this danger, attention should be given to the diet, general hygiene, and exercise both of body and mind. Health depends upon perfect circulation of the blood; and wholesome food must be furnished to the system before pure, healthy blood can be made. Then sufficient exercise of some kind is necessary to enable the blood to perform its functions.

The best diet is one that will furnish the most nutrition, favor elimination, and at the same time not overburden the digestive organs nor act as a stimulant. Such a diet nature has abundantly furnished us in the large variety of delicious and most delicately flavored fruits, many of which are perennial in their supply; while a large number of others may be obtained at different times of the year. These fruits are toothsome, aperient, and cooling, acting favorably on the eliminative organs, besides being easily and quickly digested, — a condition most necessary to advanced life. An entire fruit diet for a day or two is one of the best means of relieving the attacks of indigestion so common with the aged.

Nuts, when thoroughly masticated or crushed, are a most wholesome article of food. They contain all the nitrogenous properties required by the body and the proper proportion of fat in the form of nut oil, both of which are easily assimilated, and supply the necessary material for the production of heat.

In addition to the abundant supply of fruits and nuts

with which nature has furnished us, there are a score or more varieties of cereals that may be prepared in as many different ways, and which, of themselves, constitute an almost perfect diet. These foods form the natural diet of man, and one that meets every requirement of his nature.

Those advanced in years should avoid any excess in the pleasures of the table if they desire to prolong their lives; for the digestive system is easily overburdened, and the least digression may result disastrously. Thomas Parr, familiarly known as "Old Parr," a native of Scotland, lived a healthy and uneventful life up to the age of one hundred and fifty-two, when he was discovered by the count of Surrey, who, because of his great age, took him to London. Charles the First, wishing to see this subject so remarkable for his age, sent for him to come to court, and sumptuously regaled him with the viands of the king. As a result, "Old Parr" died from an attack of indigestion, and not from old age, as a subsequent post-mortem examination showed, there being no signs of physical degeneration present.

Seneca said, "Man does not die; he kills himself." It is true that man rarely attains the full limit of his life, it being abridged by his violating the laws of his physical organization. To be temperate in eating and drinking is to live well, and to live in health. Professor Hufeland says: "The more slowly man grows, the later he attains to maturity; and the longer his powers are in expanding, so much the longer will be the duration of his life. If you would live long, live moderately, and avoid a stimulating, heating diet, such as a good deal of fish, flesh, eggs, chocolates, wine, and spices." Shakespeare said, with a great deal of truth, "Dainty bits make rich the ribs, but bankrupt the wits;" and again, "Fat paunches make lean pates." William Cullen Bryant, who enjoyed most excellent health and vigor up to eighty years of age, when asked the secret of his years, replied, "It is all summed up in one word — moderation."

Many of the early Christian fathers, who limited themselves to a most frugal diet, consisting mainly of bread and water, attained to a remarkable age. St. Anthony lived one hundred and five years; James the Hermit, one hundred and four years; Arsenius, the tutor of the Emperor Arcadius, one hundred and twenty years; St. Epiphanius, one hundred and fifteen years; Simeon Stylites, one hundred and twelve years; and Romanul, one hundred and twenty years. Cornaro, the famous Italian writer on dietetics, was given up to die at forty, but adopted an abstemious diet, and lived to be more than one hundred years old.

Tea, coffee, cocoa, and all forms of alcoholic drinks should be carefully avoided, for all are inimical to natural vigor and longevity. Copious drafts of water should be taken daily to flush out the kidneys, and keep the tissues free from impurities.

Frequent bathing is necessary to keep the skin cleansed and in an active condition. The temperature of the bath should be near that of the body. As the heat production in old age is not so great as in youth or middle life, careful attention should be given to the proper clothing of the body, it being necessary to maintain an equable temperature. Extremes of temperature should, so far as possible, be avoided.

The next important thing to be considered as conducive to longevity, is exercise. The changes incident to advanced years make this most necessary. Aside from the performance of domestic duties and gardening, walking is the best form of exercise for the aged.

Sir James Crichton-Browne, speaking of the advantage of exercise, says: "It seems a physiological law that the functions of the body must be kept in exercise in order to maintain its efficacy; and it is as true of the body as of the mill, or of any other machine, that it will rust out from disuse sooner than wear out from employment. The fact is constantly observed in persons engaged in commercial pur-

suits who retire at the age of sixty, and then fall into rapid decay, while professional men remaining at work preserve their vigor often for another twenty years.

"It is a sad thing to see the nerve-centers decay, with a corresponding weakness of body and mind; but it is still sadder to witness with a wrinkling of the skin, a corresponding shrinking of the brain, allowing vanity and some of the weaker passions, which had been kept in suppression, to come again to the fore. How different is the spectacle when the organ is kept in its integrity by constant use, and the mental faculties are preserved in all their pristine force. We have only to look around and see our poets, bishops, judges, ministers of state, and medical men, long-lived and still in mental vigor while working at their respective avocations. . . . It is clear that hard work does not kill. The toil, however, must be genial and diversified."

Bryant, at the age of eighty, maintained regular, systematic physical exercise, and was noted for his long walks. John Wesley was as firm a believer in the religion of good exercise as in the doctrine of salvation by faith, and his long and useful life was no doubt due in a great degree to the firm physical basis which he laid in his schooldays, and which he never neglected in after-life.

Mr. Gladstone was noted for his outdoor life, and gained considerable notoriety because of his enjoyment in felling trees in Hawarden Park. When asked the secret of his vigorous health at eighty-three, he replied: "There was once a road leading out of London on which more horses died than on any other, and an inquiry revealed the fact that it was perfectly level. Consequently, the animals, in traveling over it, used only one set of muscles. Continuous employment of the same physical powers on the same lines results in physical exhaustion. It is varied and symmetrical exercise of all the muscles that lies at the base of any sound system of physical training."

In many instances farmers, after laboring early and late for half a century, retire, and move into the city, with a view of spending the remainder of their days in ease, enjoying the fruits of their labors. Having been accustomed to hard work all their lives, they have been blessed with health; but their inactive lives, in connection with their new environment, soon make them susceptible victims of disease and death. These results are often hastened by overeating, as they usually continue to eat just as heartily as they did when working in the fields. They, however, have no idea of the cause of their trouble, as they do not realize that it was hard work that formerly kept them in good health.

Decrepitude is not necessarily an accompaniment of longevity; it is the result of physical digressions which in later life produce general decay and wasting. The adage, "Old men for counsel, young men for war," is still sound wisdom, and it may be more appropriately applied to the physical, mental, and moral battles of life than to the strife on the veritable field of battle. The aged should not be considered, by themselves or others, as superannuated members of society; nor should the last decade of their lives be spent in solemn meditation upon death. They have a work to do, and should so order their lives as to be in condition for it.

Much has been written at various times regarding the influence of mental activity on the health and upon longevity. There can be no doubt that the continued exercise of the mind tends to prolong youth. Hard study and indefatigable mental action have proved to be the elixir of life to many noble souls, and would still add years to the lives of others who are undergoing premature decay and degeneration. Genius is hard work, and life is activity. Worms do not bore into the live tree; they feed upon wood that is dead.

It is the presence of sad thoughts, dwelling upon the unpleasant pictures of life, with unvarying scenes, the utter weariness of an empty mind, the monotonous repetition to-

day of yesterday, to-morrow of to-day, that produces old age. The human mind has been endowed with many faculties, and a diversion of mental work must be furnished it if healthful activity is to be maintained.

Mr. Gladstone is quoted as saying: "What is destructive to nervous force and intellectual vigor is continuous concentration of purpose upon the same object. What the great majority of workers need is not the rest that comes from complete cessation of activity, but rather the rest that comes from change of employment." Mr. Gladstone never became so deeply engaged in affairs of state as to lose sight of his classical studies, or of Italian literature, of which he was very fond; nor of the leading economic and religious questions of the day, or even of fiction, yet this "grand old man" lived to the age of eighty-seven years.

A recent writer well says: "It is sad to see how many elderly and middle-aged women take it for granted that life holds nothing for them but the passive rôle of grandmother. Many a woman has but little time for study while rearing a family; but when the children are married and gone to homes of their own, then comes the time when she needs some outside interest. If she has not something to take her out of herself, she will turn to gossip and fancy work to keep her busy. This is just the time for her to devote herself to some particular study. Let her take up one that was a favorite in her schooldays, whether it be one of the sciences, painting, or music. . . . The women who never grow old are the student women, those who daily drink in some new chyle through memorizing, thoroughly analyzing, and perfectly assimilating subjects apart from themselves. Study is development — it is eternal youth. The student woman, who makes wise use of her acquisitions, has no time to corrugate her brow with dread thoughts of the beauty destroyer leaping fast behind her. Not considered or invited, Old Age keeps his distance."

Time would fail to tell of the distinction won by people far from being young, and of the years added to their lives, simply because of their earnest mental exertion. George Eliot was thirty-five before she began the first of her great works. Ogilvie began the study of Greek at fifty, and made an excellent translation of Homer; Galileo at seventy pursued his studies with unflagging zeal; Michael Angelo designed the rebuilding of St. Peter's at seventy-one, and had charge of the work until he was eighty-nine. He produced his masterpiece, "The Conversion of St. Paul," at seventy-five, and died at ninety, still working. Titian lived to be one hundred years old; and at eighty-seven produced his masterpiece, "The Last Supper." Stradivarius made his most famous violin at ninety; his eyesight failed at eighty-five, but he still continued to make violins, and lived to be nearly one hundred years old, spending only his last year in idleness.

Lord Brougham lived eighty-nine years; Lord Lyndhurst failed at ninety-one. Epimenides, the seventh of the wise men, lived to the age of one hundred and eighty-four. Hippocrates reached ninety-nine; Pythagoras was eighty when he was murdered; Dr. Franklin lived to eighty-four; Montgomery, the poet, to eighty-two; Sidney Smith to seventy-six; and Sir Isaac Newton to eighty-five. Socrates was murdered at seventy, Plato died at eighty-one, and Aristotle at sixty-three. Herodotus lived to be one hundred. Goethe died at eighty-two, Voltaire at eighty-four, Handel at seventy-five, and Haydn at seventy-seven. All these were brain workers, and most of them owe their long lives to their mental activity. They enjoyed their work, as all brain workers do.

Works of benevolence and a life spent in philanthropy react on the physical health in a most salutary manner; for in such a life, self is held in abeyance, and as a consequence there is less nervous tension, the blood circulates more freely, digestion proceeds with more promptness, and a better qual-

ity of work is performed. There is more freedom from anxiety, worry, and care; and associated with this is the consciousness of right-doing. Statistics gathered at different times clearly show the average duration of life of this class of workers to be greater than that of any other. Canon Farrar says: "In the cultivation of a sympathetic heart we do ourselves more good than those we serve. As we grow old, let us cultivate a sympathy for the world at large, for its weakness, for the young; and the returns will come to us a hundredfold. The world ever gives us freely that which we give to it."

Nothing will keep the heart so young as the cultivation of a spirit of cheerfulness and thankfulness for life and all the good and beautiful things which it brings us. Such a spirit will be a great antiseptic against premature decay and the waste of old age.

"The serene old age which is secured by temperance, sobriety, and the conquest of vicious appetites and passions,— the long, mellow autumn of life, in which are harvested the fruits of useful toil,— is to be coveted and striven for by all."

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Wasting away of muscles.— Arthritis deformans, 378; multiple neuritis, 399; sciatica, 400.

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APPENDIX

Some Things Parents Should Know

The present condition of society is such as to cause urgent need that parents and their children be educated in matters pertaining to sexual hygiene. The conditions prevailing in our social life are so serious that it is time to "cry aloud, spare not, lift up thy voice like a trumpet," and show people their transgressions and their need of reform.

The prophet Hosea warned, "My people are destroyed for lack of knowledge." Worse than this, he says they have even "rejected knowledge." These statements are literally true when applied to sexual life. The annual death toll from the social diseases (syphilis and gonorrhea and their complications), and the misery and woe and unhappiness and blighted lives and domestic wretchedness resulting from these diseases, are such that the recording angel must hide his face for sorrow and in pity. No pen can portray the condition that exists in the world to-day.

This is not all. Children are born into the world without the capacity to live, or if they do live, are defective mentally or physically, and become a burden upon society and the state. The following facts taken from literature on this subject should be considered by every parent:—

1. Twenty per cent of all blindness is due to gonorrhea on the part of one or both parents.

2. About fifty per cent of all involuntary childless marriages are due to gonorrhea.

3. From one fourth to one third of all cases of insanity are due to syphilis.

4. According to various authorities, forty to sixty per cent of all operations upon women for diseases of the womb or the ovaries are due to gonorrhea. One author makes the percentage seventy-five.

5. Every prostitute, public or private, contracts venereal disease sooner or later, and infects all who patronize her.

6. There is no immunity from these diseases, and it is doubtful whether a person who has once received the infection can be cured.

THE NEED OF KNOWLEDGE

These facts justify the plea for more study on the part of parents in reference to these matters, not only as a protection to themselves, but that they may give the proper instruction to their boys and girls, in order that they too may avoid the danger. This is a responsibility that rests upon the parent. If you do not have the confidence of your boy and girl so that you can talk with them in reference to this important matter, you will not have their confidence in their secrets and the inquiries that naturally and surely come to the young mind.

The mysteries of life are presented sooner or later to every boy and girl, and fortunate indeed is the boy or girl to whom these matters are explained by the parent in a simple and pure and natural way, without arousing undue curiosity. This subject is a natural one; and if it is presented to the developing child in a natural way as a part of the information that he is entitled to, it will leave a good impression, and bear the right kind of fruit later. Some children develop earlier than others, and parents will have to consider this fact in determining the proper age to begin this instruction. As a rule, boys and girls eleven years old should begin to know something in reference to these matters, in order to keep their minds from being poisoned by older ones, who may sow seed that never can be uprooted. At this age, the parent should have the confidence of the child, so that if older ones are trying to sow evil seed, the child will feel free to come and tell mother or father. It is easy to find out how much your child knows about these things, that has come to him through evil associates. I say "evil associates," because these same children have been neglected by their parents, and have obtained their informa-

tion from an evil source, and are passing it on to minds as innocent as theirs were once. They are not to blame. The responsibility rests higher up. But it is necessary, just the same, to protect our children from this evil influence. One almost has the feeling that the devil camps on the trail of every boy and girl early, to pollute their minds by some means, and thus start them in the way of impurity.

How many who are now parents can look back to the days when they were hardly in their teens, and recall evil information that was imparted to them by older ones — information and suggestions that led to impure thoughts and acts,— thoughts and acts that developed with their lives, and grew into almost overmastering passions, which they have not learned to control even in their married lives! The world is full of men and women who have no power, spiritually, mentally, or physically, because of the excessive exercise of their racial functions. The beginning for this condition was laid away back in the early years of life.

Vice is common among boys and girls whose parents think them innocent. Early instruction would prevent most of this. Immorality among boys and men constitutes one of the grave problems of the day. Dr. Winfield Scott Hall, of Northwestern University, says: "As a result of many hundreds of conferences with college men, I have become convinced that a great preponderance of sexual troubles (bad habits and diseases) would have been avoided if these individuals had been properly instructed. Sexual abuses are largely due to ignorance, and ignorance is largely attributable to the failure of parents to discharge their duty."

This is a serious charge, and yet any experienced physician knows that it is only too true. Parents, begin now to lay the sure foundation for your boys and girls. Start them right, and as they develop into young manhood and womanhood, add to their information. Surround them with such home influences, good books and associates, that their minds may be kept active along the lines of wholesome suggestions.

Teach them early to make you their confidant, and this will open the way for you to make such suggestions as occasion

requires. When this is done, you will see your children avoiding playmates who talk about impure things. Do not lie to your young children, and tell them that the stork brings the baby, or that the doctor brought it in his satchel. They will remember this later, and know that you did not tell the truth. It is not necessary to tell an untruth to answer the question.

The instruction that follows in reference to what the boy and the girl should know, is given as a suggestion to parents. Those who wish to make a more thorough study of the subject, can easily procure books that take up all the various phases of this subject in detail.

WHAT A BOY SHOULD KNOW (11 TO 14)

There is a saying that "One boy is a boy, two boys are half a boy, and three boys are no boy at all." The reason we say this is because a boy likes to play and have a good time, and it is difficult for him to think of anything else. Two boys can play still harder and do less work, and three boys — well, what they can not think of in the way of play and having a good time, is hardly worth thinking about at all. Three boys have a splendid forgetter so far as work is concerned.

A boy of ten to twelve likes to be able to run and jump, and "chin himself," and clench his fist, draw up his forearm, and say, "Just feel my muscle — see how hard it is!" In other words, a boy likes to be strong, he wants to be like a man.

In order to be strong, certain things are necessary. First, a boy must have food, and plenty of it; and the amount of food that a twelve-year-old boy can put away is something to be marveled at. But it is all for a good purpose, and therefore his father and mother do not care, because they know that food makes the boy grow, and makes him strong. Second, a boy must have plenty of exercise to develop his muscles and to stimulate his growth. Third, he needs proper rest, which is best taken in having nine or ten hours of sleep

in a well-ventilated room, or better still, sleeping in a tent or on the porch. Fourth, plenty of study, and reading of good books, to give him a strong and clean mind. Fifth, frequent bathing to keep his body clean and sweet. Every boy would be stronger and have better health if he would give his body a quick cold rub every morning before dressing.

All these things will give a boy abundance of red blood to supply all the needs of his body and keep it growing. The blood is a real stream of life flowing to all parts of the body. A boy can not have good, clean blood without eating simple, wholesome food.

All boys of twelve years have studied enough about their bodies to know that they have many different organs to do the work of the body. There is the brain, the chief of all, with which you think. There is the heart to pump the blood, and the stomach to help get the food ready to build the body. Then there are some organs that we call glands, which are very important and necessary to keep the body in health. These secrete fluids which pass into the blood and help build a vigorous body and mind.

In all male animals, two of these glands are placed outside the body, and they are put in a little sac, or bag. If they are injured or removed, the body suffers a great loss, and can never be what it would be with them. Farmers remove these glands from the male calves, and from the male colts, and these animals grow up to be very different from the beautiful stallion, or the great bull, the lord of the pasture. There was a time when these glands were removed from some boys when they were about twelve years old, so that they would grow up to be different from other men. They were called eunuchs. They were usually cowards, had a voice like a woman, and were awkward in appearance. Any boy knows that a woman may have a very beautiful voice; but if he hears a man with a woman's voice, he does not feel that that man is all he should be. Some of the glands of the body help to make a man a real man, and a woman a real woman.

IN THE BEGINNING

In the beginning, the Bible tells us, God made the grass and the flowers and the trees all bearing seed. That is, they were all made mature, or with ripe seed ready for planting to grow and to produce other plants and flowers and trees. Then God made a pair of each of the animals, a male and a female, and these were already full-grown, ready to reproduce other animals just like themselves. This is God's order in the animal world. This is the only way there can be other animals. If there were only males of a certain animal, there could be no more animals like that one. If they were all females, the same would be true. This particular type of animal would soon be lost to the world.

Then the Bible says that "God created man in His own image," and He called them male and female. He made a mature man and woman. Then they were to "multiply," or by means of the powers God gave them they were to produce other beings like themselves. Thus we see that in the plants, in the flowers, among the animals, and with man, God has given a definite law that like shall produce like.

There are male trees and female trees; there are male plants and female plants; there are flowers in which both the male and the female or the father and mother organs, are found.

POWER OF REPRODUCTION

Most boys know a little about flowers; but when you are older and study botany, you will understand these things much better. However, I am going to tell you a little about how plants produce other plants.

If you will take a peach blossom, or an apple blossom, or a violet, or even an ordinary milkweed, you will see what a wonderful arrangement the Creator has made in order that we may have the flowers and the fruits. If you will take a toothpick and separate the parts of a blossom and look carefully down into the center, you will see a tiny stalk. This is called the *pistil*. At the bottom of the pistil there is a slight enlargement in which are some little seeds; and this

is called the *ovary* of the flower, or the mother part. Running from the top of the pistil to the ovary is a little tube no larger than the thread of a cobweb.

Now if you will look carefully again, you will notice several little stalks around the pistil. These are called *stamens.* On their top ends are found usually two little pockets, in which is a very fine substance called *pollen,* or the father substance. When the wind blows, the air may be full of pollen, and it is lost. The only way the flower can reproduce itself is by bringing the pollen in contact with the end of the pistil, so it can pass down the cobweb-like tube to the ovary. Here comes the interesting part of the story. Down in the bottom of the flower, the Creator for a wise purpose placed some little sacs of nectar or honey. Miss Busy Little Bee is very much interested in the sweet little drop, and she runs a little suction-pump down there, and proceeds to draw the honey up into her body. As she does this, her six legs are all in motion, and she bends the stamens over to the pistil, rubs the pollen off, and scatters it around generally, and thus fertilizes the flower, or enables the seeds to produce other flowers. As Miss Bee flies away, she carries much of the pollen with her on her legs; and as she comes to the next flower, her moving six legs scatter the pollen in the flower, and it also is fertilized. This is a difficult way of getting flowers, but the flowers of the next season are the children, and we are glad to see them.

This is God's plan for keeping the flowers in the world from dying out. He has a similar plan for all the animals and for man. And so long as they all obey His laws, they will not die out. What is true of the apple blossom and the milkweed is also true of the rose, the lily, the worm, the ant, the horse, the cow, and highest of all, man.

In the spring, on parts of the Pacific coast, we have what is called a "run of salmon." These large fish come in from the salt water and pass far up the fresh water streams, going up swift streams, up rapids, over dams, and finally into shallow, quiet water. What is all this effort for? — It is for breeding purposes, that there may be more salmon.

You remember that in the flower, we found the mother element, or the ovary. In the fish, the ovary is in the body of the female, and she is full of eggs, thousands of them. The mother salmon selects a clean place and lays her eggs; and the father salmon passes over these eggs, and pours out of his body the fertilizing elements, or seeds; and wherever this comes in contact with the eggs, in a few days there will be thousands of little salmon hatched. The wind blows the pollen away, and it is lost. The water current washes the fertilizing seeds from the male fish away, and they are lost. A milkweed is said to have sometimes a thousand flowers, and yet only about a half dozen pods develop with mature seeds. There may be ten thousand male bees in a hive, but only one of them can become the father of the young bees in the eggs laid by the queen.

Now I want to tell you about reproduction in fowls. As you know, the hen lays an egg with a hard shell all over it. You also know that to hatch chicks, the eggs have to be kept warm, either by the hen sitting on the eggs, or by being put into an incubator. Sometimes, after we have put eggs under a hen, and she has been sitting a few days, say five days, we take one of the eggs, and hold it up to a bright light, and shade it with the hands, and lo and behold, we can see the heart of the forming chick beat and move around. In a few more days, you can see the chick kick; and in twenty-one days, it hatches out just as perfect as the mother hen, only smaller. But I pick up another egg out of the nest, and look at it with the light, and find that it is a perfectly clear egg. What is the difference in these two eggs? — The one that had the live chick in it was a fertile egg, or had the father or rooster element or seed in it, and the other did not.

The ovary is in the hen's body, and from this she forms the yolk and the white of the egg. But at first this egg is very small — so small one could hardly see it. In the rooster's body are two glands called testicles, and these form little bodies that have the same purpose that the pollen does in

the flower. The rooster places these little seeds, thousands of them, in the body of the hen, and they unite with the eggs she is forming. These eggs are of all sizes, as you may have noticed sometime when your mother killed a chicken for dinner. When the egg is fully formed, the shell is placed around it as a protection, and then the hen lays the egg. When she has laid about a dozen, the mother hen becomes broody, and begins to cluck, just as if she already had the chicks. You see she has faith in those eggs. In twenty-one days she has a lot of little chicks in appearance very much like herself. This is the way chickens reproduce themselves.

In animals and with human beings, reproduction differs from that of the fish and the birds in this way: instead of the egg's being laid outside the body, and hatched into a living form, the egg is laid away carefully in a special place made for it inside the mother's body, and it develops there until it is large and strong enough to live outside the body, and then it is born into the world. This is true of kittens, and pups, and the calf, and the colt, and of the little baby that comes as a blessing into the home, perhaps to be your brother or sister. And then the mother's body furnishes the food for it until it is strong enough to eat other food.

A boy should remember that when his body was forming, his mother carried him inside her body, and nourished him with her blood; and after a time, through much pain, she gave birth to him, that he might have his own life, and in time grow to be a man. This should lead a boy to love and reverence his mother, and never, never talk carelessly about this most marvelous thing in all the world. The most wonderful part of all the creation was the making of a man and a woman Likewise there is no more wonderful thing in the world that a man or a woman can do than to become a father or a mother.

The reproductive organs are very important, and as I have already said, they have much to do toward making a boy grow into a complete, strong man. For this reason, a boy should keep them very clean. He should not handle them

with his hands, and especially when he goes to bed at night. Form the habit of sleeping with your hands above your shoulders or across your breast, but never on your reproductive organs. This is a bad habit, and leads to impure thoughts and acts. No boy who loves his mother and his sisters would want to form such a bad habit.

Do not talk about these organs to any boy, and never let any boy talk to you about them, or say things that you would not wish your mother to hear. This is a subject that good men never talk about with one another, and boys should not do so. Be a manly boy.

WHEN A BOY IS FOURTEEN OR MORE

When a boy is about fourteen, important changes are taking place in his body that have a great influence on his future development. He is changing from a boy into a man. His shoulders broaden. His voice becomes deeper in tone, for his vocal cords are growing longer. Incidentally he can make a lot more noise in the home for his mother and father. Hair begins to grow on the upper lip, on the face, on the legs and arms, under the arms, and around the sexual organs. The reproductive organs are increasing in size, and the glands (the testes) that are suspended in the scrotum are beginning to secrete a fluid that is poured into the blood, and helps to develop the brain and the nervous system. When this fluid is wasted, the nervous system is the first to suffer.

A boy who abuses his sexual organs, suffers at once for his wrong, and he will lose his manliness. When you take a bath, see that the organs are made clean, but never rub them. If a boy, when he is alone, commits self-abuse, or masturbation, he will have flabby muscles, and will feel weak and tired. He will have a poor memory, and will lose the desire to study. His will-power will be weak. He will lose respect for himself; and in a little while others will lose respect for him, for his very face will tell the tale. No boy can be much of a man and continue in such habits. Boys who have been led into the habit of self-abuse should stop at once. If they do, the forces of the body will come to

the rescue, and repair the damage as much as possible, and bring back their manhood and vigor.

Many boys, when they are about fifteen or sixteen years old, may notice that they have an emission of semen at night while they are asleep, or they may have a "wet dream;" but boys who have pure thoughts, and have not abused themselves, and do not sleep with their hands on their sexual organs, are not likely to be troubled with these losses. However, if you are, do not give it another thought, for it will never do you any harm unless you have such emissions several times a week. If you feel troubled, it may be necessary to consult a good physician. But never, never go to see a quack doctor or one that advertises to make cures of such troubles; for he will not only rob you of your money, but he will rob you of your manhood and of your very life-blood, and then will pass your name on to other human vultures like himself.

One of the greatest trials a young man has, comes in the form of impure thoughts. Do not harbor such a thought. Two things can not occupy the same place at the same time. Make a great and continuous effort to have only pure, clean thoughts. More than three thousand years ago, a man asked the question, "Wherewithal shall a young man cleanse his way?" All young men from the beginning of time have been tempted to have unclean thoughts, and all have had. But here is the answer to the question: "By taking heed thereto according to Thy word." Any man who will fill his mind with the pure words of the Scripture will be able to overcome impure thoughts. This is a case of overcoming evil with good.

The following suggestions will help any young man to live a clean life and to overcome sexual temptations:—

1. Do not let the mind dwell on sexual matters, do not read quack literature on these matters, and do not talk about these things with other young men. It is not a proper subject for conversation.

2. Eat *simple,* plain, wholesome food, and avoid all condiments.

3. Never listen to or laugh at unclean stories.

4. Avoid tobacco and liquor in all their forms.

5. Take plenty of healthful exercise in the form of outdoor sports and useful work. Take just as much interest in your work as in your play.

6. Keep the bowels regular, and avoid going two or three days without having a stool.

7. Keep clean, and invigorate the body by taking a daily cold rub.

8. Seek the company of only pure-minded companions.

9. Cultivate a deep respect for all women, and protect all girls as you would your own sister. Never allow yourself to be familiar with any girl, however well you may be acquainted. Familiarity is one of the steps to wrong-doing. A boy with the spirit of manliness will take no liberty with a girl that he would not have another boy take with his own sister.

10. Self-control and firm principles are necessary, for every youth will be sorely tempted.

WHAT A GIRL SHOULD KNOW (10 TO 14)

(Much that has been written for boys in reference to reproduction in plants, flowers, fish, and animals, is suitable for girls, and the mother can use as many of the illustrations as she thinks necessary. As a matter of fact, if fathers and mothers have the confidence of their boys and girls, either one is in a position to give the necessary instruction. The sex line should not be drawn in the family.)

Girls study physiology in the schools, and learn much about their bodies,— how the blood circulates, how they digest food, something about the brain and the spinal cord, about the five senses, the many wonderful things the skin does, and many other marvelous things. Girls can run and jump, and climb trees, and skate, and swim, just as well as boys can; and they ought to do all these things just as well as boys, for their bodies differ but little from their brothers' up to twelve years of age. If a girl wore her hair short and

dressed as her brothers, it would be quite difficult to say whether she were a boy or a girl.

But after a time, girls begin to develop a different shape in their bodies, and certain changes take place. You have already learned something about the way flowers increase from year to year, and how the little fish are hatched from eggs that were laid by the mother fish and fertilized by the father fish. You have also learned how the egg is formed in the hen's body from a little gland called an *ovary*, and the rooster places in her body a little seed that unites with the egg before the shell is formed; then after the egg is laid, and other eggs, the hen sits on them for three weeks, and the chicks are hatched. You have learned how all the higher animals are different from the flowers, and the fish, and the birds, for in animals the egg passes from the ovary into a little nest called the *womb*, and there the young are developed until ready to be born. These organs that produce other like living things are called the *reproductive organs*.

From birth, the girl's reproductive organs are in her body, but they do not grow much until she is about thirteen years old; and then as her body begins to grow more womanly, these organs grow rapidly during the next few years. Her body rounds out and becomes more graceful in form, the breasts enlarge, the hips broaden, the face becomes fuller, and the mind matures rapidly. As these changes are taking place, the reproductive or sexual organs are increasing in size in the pelvis, or lower part of the body. This is why the hips broaden, to make more room for the ovaries and the womb, and for their future functions.

When a girl is about fourteen, she may have a little backache, and a heavy feeling low down in her body, every few weeks. This shows that her reproductive organs are about ready to perform their first function. This is what is called *menstruation*. It is manifested by the appearance of a little blood which comes from the womb and appears upon the external sexual organs. This will continue about three or four days, and will return every twenty-eight days. During

this time, girls often feel tired and dull. When this experience first comes to the girl, she need not be alarmed, for every woman in the world before her has had the same experience. The appearance of menstruation is a sign to the girl that she is having a normal development, and that it will help her to be more womanly and have more vigor. Girls who do not menstruate until they are seventeen or eighteen, develop into women very slowly. So menstruation is a sign of health.

Health is one of the greatest possessions that a girl can have in this world, therefore every girl should do all she can to guard her body from everything that might weaken it.

1. Girls need just as much exercise as boys, and that is considerable. They need to be much out-of-doors. At about this age, girls are too inclined to stay indoors and read stories or do fancy work. This is not the best way to insure good health. One can not have a sound mind without a sound body.

2. A girl should dress with simplicity and in good taste, and in cold weather she should be careful that the legs and the ankles are well protected. Many neglect this, and thus lay the foundation for future sickness. She should be careful about wearing tight collars, tight waistbands, tight garters, and tight shoes. Every girl would have better health and a more graceful body if she did not wear a corset. No girl (or woman) should wear high-heeled shoes. They deform the feet, make her awkward, and in time have a bad effect on the nervous system. High heels throw the hips forward, give an awkward poise, and cause displacement of organs. Modesty in dress is called for in these days. Many girls and women follow the fashions so closely, and dress with so few clothes, that almost every part of the body can be outlined. Such dressing is immodest, and its suggestiveness constitutes a temptation to young men and even older men to impurity. Modesty in dress will go a long way toward protecting a young woman from insult, or from undue familiarity on the part of men.

3. A warm bath should be taken at least once a week; and a cold rub taken daily will add much toward giving a pink,

soft skin and a beautiful, clear complexion. Every girl should form the habit of keeping the external genital parts clean and free from odors. Washing with soap and warm water should be a daily matter. Neglect of cleanliness often leads to self-abuse and grosser evils.

4. Every growing girl should sleep from eight to ten hours. Always sleep in a cool room with the windows wide open. Sleeping in a tent or on a screened porch is still better.

5. Eat simple food, avoid condiments, and if you wish to have plenty of nerve force and a clear complexion, avoid tea and coffee. Eat freely of fruit, have a regular time for stool, and never neglect the bowels.

6. "Undue excitement should be avoided, and social amusements should be kept at the minimum, as they are usually attended with late hours, breathing of foul air, and an unnatural stimulation of the mind and of the sexual emotions. Especially is this true of the theater and the dance. Such amusement can not be indulged in without undermining both physical and moral health. A girl should not allow herself to become familiar with boys, nor should she allow any boy to take liberties with her in word or in deed." Select companions among girls and boys who are clean and pure. Make a confidant of your mother, and never talk about things with other girls that you would not talk about with her.

7. During the menstrual period, more rest should be taken, and heavy lifting, straining, and exciting physical exertion should be avoided. Girls should be careful about getting the feet wet during this time, nor should they sit on the damp ground or on wet places. Many girls have cramp-like pains at this period, which are due to obstruction of the flow. Hot water bags and the hot hip bath will give some relief. A slight operation offers the only permanent relief.

THE YOUNG

The study of physiology is a study of the processes of life. For this reason, it should occupy an important place in the education of every boy and girl, every young man and woman. It is necessary that every young woman should

have a good general idea of the functions of her body, such as the process of digestion, the circulation of the blood and lymph, respiration, elimination, and the nervous system. It is fully as necessary that she should have a general idea of the organs that make her peculiarly a woman; and once possessing this knowledge, there is no more reason that she should continue to think about it, than that she should think about the heart or the liver. After knowing something about how to maintain the body in health, the less we think about it the better we are. The healthy young woman should be almost unconscious that she has a body.

There are certain general principles that every young woman should early adopt as governing rules in her life; and these, made practical in daily life, will add much to her influence in the world:—

1. "Unto the pure all things are pure." Purity of life and thought rests as a royal diadem upon any woman. It is a great asset, more precious than rubies.

2. Dress modestly and neatly, and ever remember that there is a moral side to dressing for which each woman is in a measure responsible. Suggestive clothing on the part of a young woman will invite more than befitting attention from men.

3. A young woman who will drink beer or wine is on dangerous ground. Particularly is this true at the dance.

4. By her general behavior, a girl may encourage or discourage any improper advances on the part of men. A moderate voice, with pure language, and avoidance of slang, is a protection to any girl. To sum up, proper conduct is the best protection to any young woman.

HEALTHY MARRIAGE

"When a girl accepts a man's courtship with marriage in view, she usually knows something about his social, financial, and business standing. She also has a right to know something about his physical condition, especially as regards his sexual health. A man would never think of marrying a woman who is sexually imperfect; no more should a woman

be expected to marry a man of similar condition. A girl contemplating marriage should require that her intended husband present satisfactory evidence of freedom from venereal disease. This could be done through her father or her brother, or the family physician. She may have unbounded faith in his good character, and he may appear an ideal man; but neither of these is a guarantee that he is free from gonorrhea or syphilis, for he may convey his disease to her and her children, with all the suffering that attends it. Many such marriages as this end in the divorce courts; but because of the shame, the reason is seldom made public, the separation being secured on some other ground."

Infantile Paralysis

This disease is considered in its proper place in the preceding pages; but as some new facts in reference to it have been brought to light during the past two or three years, attention will be called to these points here.

There is now positive proof that infantile paralysis is a disease due to a specific germ, and is contagious and infectious in the same way as some of the other acute diseases. It has appeared in epidemic form in many parts of the country. Because of its infectious nature, many State Boards of Health have already instituted quarantine regulations for patients that have this disease. Wherever it appears, it should be reported at once to the proper health officer. When a disease becomes a menace to the public welfare, all should cooperate with the proper authorities to restrict its ravages.

The Massachusetts State Board of Health has very recently conducted experiments which prove that the stable-fly has by its bite caused infantile paralysis. This fly is different from the house-fly. It is found in stables, and lives by biting animals, especially horses and cattle. It is not usually found in houses, but flies around in the sunshine. The stable-fly is much more likely to bite than the house-fly, and as it may enter the house before a storm, probably this is the fly that does most of the biting of human beings.

These discoveries go hand in hand with the fact that infantile paralysis is most common in the summer-time or during the fly season. However, this is not the only means of transmitting the disease.

In the light of this knowledge, there is all the more reason why a war of extermination should be conducted against the fly. Houses should be screened, no filth should be permitted anywhere around the home, farmers should see that manure is not allowed to collect about stables, and stables should be kept clean.

Infantile paralysis is most common in hot weather, and is most frequent during the first years of life, up to ten

years. However, adults are not free from it. Several cases among young men and women have come to the writer's notice during the past two years.

The poison of this disease attacks the front part of the gray matter in the spinal cord, causing a paralysis and wasting away of the muscles supplied by the part of the cord involved.

Symptoms.— At times this disease appears very suddenly. A child may go to bed at night apparently well, and in the morning be unable to walk. Children generally have some fever, 101° to 103°, followed by sudden paralysis, usually in one or both legs. There may be vomiting or convulsions. In infants, diarrhea sometimes precedes the attack. Wasting of the muscles soon follows. Some children have pain in the back and legs at the beginning of the disease, and such cases are likely to be mistaken for rheumatism. After a few days to several weeks, improvement begins, and may continue for a number of months, but with permanent disability. Some cases will entirely recover. The severity of the attack is no indication of what the outcome will be. The muscles of the lower leg are most frequently involved, and then only certain groups of muscles, and as a rule only one leg or arm is permanently disabled.

Treatment.— Call a physician, isolate the patient, and protect other members of the family as much as possible. Give hot packs to the legs and body for the first few days, and get up good perspiration. After the first week, give hot and cold sponging to the spine for ten minutes twice a day. After a few weeks, massage and electricity, faradic and galvanic, to the spine and legs, will do much to restore the muscles and the nerves to normal action. A few weeks or over a year may be required to get the use of the limb again. In case of "foot-drop" later, an operation may be necessary.



Swat the Fly

The innocent appearing house-fly, which has been looked upon for ages as a harmless nuisance and a necessary part of the domestic life during the warm months, has only in recent years come into particular disfavor. Now this insect which has infested our homes by the thousands is known to be one of the worst enemies of mankind. Terrible charges are made against the fly, and not all is known yet. On the evidence "in the matter of the People against the Common House-fly," the verdict is, "Guilty." The fly has been proved guilty of the following serious charges: It is a carrier of typhoid fever by carrying the germs from the sick to the well; it is a carrier

of tuberculosis; it is a carrier of leprosy; it is a carrier of infantile paralysis; it is a carrier of acute intestinal diseases among children; it is a carrier of "sleeping sickness" in Africa; it is a carrier of Asiatic cholera; and no doubt time will show that it is the means of communicating many other diseases that afflict the human race.

Observations and experiments have clearly demonstrated that the fly, the flea, the bedbug, the tick, and the mosquito are carriers of disease, and are enemies that we must carefully guard against. These insects have always been carriers of disease, and have dealt out disease and death to the race in all ages; but it is only of late that this has been known. This knowledge is already leading to advance steps



in the prevention of disease. May all who read and know, join in the march.

The fly is a filthy insect, first, last, and all the time. It is born in filth, feeds upon the discharges of men and animals, and then walks around on the bread, the butter, the sugar,—on all eatables,—leaving its own discharges. It falls into the milk, and in fact contaminates everything that we eat. No lengthy argument is required to convince even the most stupid, that the common house-fly is a very dangerous pest and an enemy to all mankind.

The fly is the most dangerous animal on the earth, more to be feared than the mosquito, the tiger, and the cobra together. And because of the great persistency and wonderful familiarity of the fly, together with the fact that for ages it has been complacently regarded as a mere nuisance, it will continue to spread disease and sorrow and death, until all men and women and children unitedly do battle against the common enemy.

There are some seven varieties of flies in our homes, but the common house-fly is the most numerous. Although often seen about stables, it is different from the stable-fly, which is now known to be one of the causes of infantile paralysis.

House-flies breed in horse manure about stables and wherever it is piled up, in decomposing vegetable and animal matter anywhere out-of-doors or indoors, in filthy corners and cracks, around wet sinks, in toilet rooms, in the kitchen, in cellars and basements, around ash piles where other matter is mixed in, and about outdoor privies.

One fly will lay several hundred eggs at one time, and in about ten days these hatch out, and in a few more days the new generation are old enough to fly about. In a season one fly will have progeny up into the sextillions. One fly has been known to carry on and in its body 6,600,000 germs. Whenever a fly lights on a smooth surface, it projects saliva from its proboscis, and this is always filled with germs. These live and multiply in the body of the fly, and therefore the discharges of the fly are full of germs.

Meat markets and grocery stores especially are fine places

for the breeding of flies, and the odors of these places furnish a strong attraction to the outside flies. Therefore as a rule, unless there are special precautions, these places are full of flies, which are found on everything that people eat. All such places should be screened, and all eatables put in glass cases or screened in, so that all flies can be kept out, and the food be free from contamination.

People in any community can create a sentiment so that those who handle their foodstuffs will be obliged to keep everything protected from the flies.

Every household, whether in the city, the village, or the country, should guard against the fly; for if this is neglected, it may mean the loss of a loved one before the summer is over. The following measures are suggested:—

1. Begin early in the spring to clean up about the house, the cellar, and the yard, so that nothing is left around to make a breeding-place for the fly.

2. Be on the watch for the first flies that appear in the house. These first flies, if left alone, can lay eggs for thousands of others in a few days. Have "fly swatters," and use them at every opportunity. It is very important to kill these first few flies.

3. Fresh horse manure is the favorite breeding-place for flies. See that manure is not allowed to accumulate about the barn. If the farmer will bear this in mind, the house will be a much more comfortable place in hot weather.

4. Those who live in the country, or who have to use an outdoor toilet, should see that the seat is covered, or better yet, screen the door and the rear, and have the drop box emptied once a week. By the means of coloring matter, flies have been traced from an outside toilet to the table within an hour. Not pleasant to think about, but a situation that has to be dealt with!

5. Screen the house doors and windows. Many do not see the necessity for doing this, but the foregoing shows the importance of this measure.

6. Large fly-traps placed at the barn and near the kitchen door will repay any one who will go to the little expense.

7. If some one in your home has any acute sickness, be exceedingly careful that all flies are kept out of the sick-room, and that discharges and secretions are disinfected, buried, or burned.

8. Remember ALWAYS that flies will not like your place if you keep it clean and free from strong odors.

9. Keep all food screened from flies, and remember that the kitchen and the dining-room are the two rooms of the house above all others where no fly should be tolerated.

Where Health Principles Are Practised

A List of Prominent Sanitariums Employing the Methods Which This Book Teaches

If you are in need of further help, or wish to make any inquiry concerning the methods presented in this book, address a letter to one of the sanitariums listed below. Your communication is sure to receive prompt and courteous attention.

Eastern States

New England Sanitarium, Melrose, Mass.
Washington Sanitarium, Takoma Park, D. C.
Washington Branch Sanitarium, 1 & 2 Iowa Circle, Washington, D. C.

Central States

Iowa Sanitarium, Nevada, Iowa.
Kansas Sanitarium, Wichita, Kans.
Madison Sanitarium, Madison, Wis.
Nebraska Sanitarium, College View, Nebr.
Tri-City Sanitarium, 1213 Fifteenth St., Moline, Ill.

Southern States

Atlanta Sanitarium, 243 South Boulevard, Atlanta, Ga.
Florida Sanitarium, Orlando, Fla.
Graysville Sanitarium, Graysville, Tenn.
Nashville Sanitarium, Nashville, Tenn.

Rocky Mountain States

Boulder Sanitarium, Boulder, Colo.

Pacific Coast States

Glendale Sanitarium, Glendale, Cal.
Loma Linda Sanitarium, Loma Linda, Cal.

North Yakima Sanitarium, North Yakima, Wash.
Paradise Valley Sanitarium, National City, Cal.
Portland Sanitarium, Mt. Tabor Station, Portland, Ore.
St. Helena Sanitarium, Sanitarium, Napa County, Cal.
Walla Walla Sanitarium, College Place, Wash.

Europe

Caterham Sanitarium, Caterham, Surrey, England.
Christiania Health Home, Akersgaden 74, Christiania, Norway.
Constantinople Treatment-Rooms, 99 rue Mussillim, Gnedik Pacha, Stamboul, Turkey.
Friedensau Sanitarium, Friedensau, Post Grabow, Bez. Magdeburg, Germany.
Frybenstrand Sanatorium, Frederikshavn, Denmark.
Lake Geneva Sanitarium, Gland, Ct. Vaud, Switzerland.
Leicester Sanitarium, 82 Regent Road, Leicester, England.
Rostrevor Hills Hydro, Rostrevor, County Down, Ireland.
Skodsborg Sanatorium, Skodsborg, Denmark.

Asia

Kobe Sanitarium, 42 Yamamoto-dori, Nichome, Kobe, Japan.

Africa

Bellair Hydropathic Sanitarium, Bellair, Natal, South Africa.
Cape Sanitarium, Plumstead, Cape, South Africa.
Kimberley Baths, 7 Cheapside, Kimberley, South Africa.

Australasia

Adelaide Sanitarium, Nailsworth, Adelaide, South Australia.
Avondale Health Retreat, Cooranbong, N. S. W., Australia.
Christchurch Sanitarium, Papanui, Christchurch, New Zealand.
Hydropathic Institute, Victoria Square, Adelaide, South Australia.
Sydney Sanitarium, Wahroonga, N. S. W., Australia.
Warburton Sanitarium, Warburton, Victoria, Australia.

South America

River Plate Sanitarium, Diamante, Entre Rios, Argentina

The

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